Safety Maintenance

AMERICA'S PIONEER INDUSTRIAL SAFETY MAGAZINE • JANUARY, 1961 • 50¢
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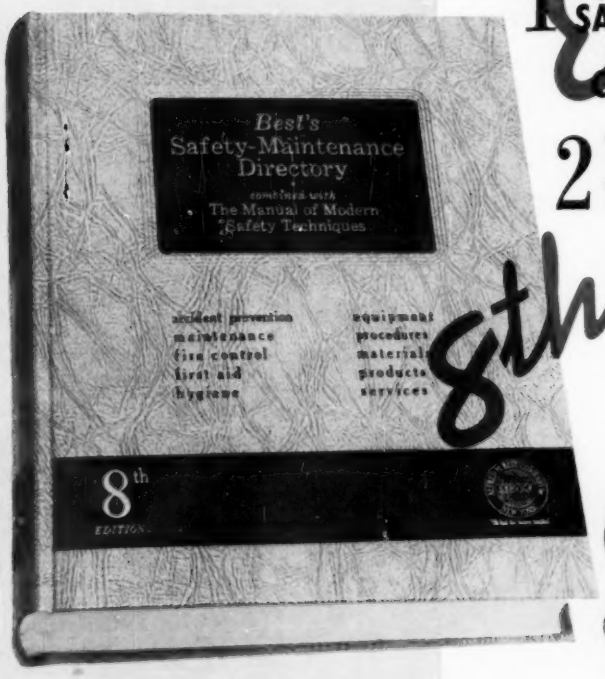

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ALFRED M. BEST COMPANY, INC.

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LOSS STOPPERS

The bulletins and catalogs reviewed below are offered by the Reader Service Department of *SAFETY MAINTENANCE*. To obtain copies without cost or obligation, write in the key numbers on the Reader's Inquiry Card.

WARNING & COMMUNICATIONS

Safety Signs **452**
Ready Made Sign Co. Four-color catalog features a wide variety of signs. In addition to those covering standard industrial needs, there are signs covering Fire Prevention, Radiation, Civil Defense, Traffic, etc.

Two-Way Radio **453**
General Electric Co. New bulletin describes table model base station two-way radio. Unit may be installed on desk, cabinet, shelf, etc. Serves as a control center permitting a dispatcher to talk with mobile radios in vehicles or on personnel.

PERSONAL PROTECTIVE EQUIPMENT

Eye Protection **454**
Sellstrom Mfg. Co. A total of 57 eye and face protection products and accessories is featured in this 16-page illustrated catalog. This includes a wide variety of plastic frame and metal frame safety glasses, cover goggles, face shields, etc., as well as information on lenses, replacement parts and the like.

Hand Protection **455**
Charleston Rubber Co. This 24-page catalog describes and illustrates the company's entire line of products, with special emphasis on milled Neoprene rubber and synthetic rubber gloves. Booklet contains chemical reference chart, gloves selector chart, and tips on the use and care of industrial gloves.

Industrial Vision Developments .. **456**
Willson Products Div. Multi-color 24-page booklet discusses current manufacturing trends, technological advances, and new hazards of modern processes and materials in relation to the industrial worker's eye protection needs, costs and other factors involved in adequate protective programs.

INDUSTRIAL HYGIENE

Noise Exposure Measurement **457**
Mine Safety Appliances Co. Two-page brochure describes an instrument designed to measure possible hearing loss resulting from noise exposure. Bulletin outlines application of the device to problems in areas of rapidly varying sound levels. Instrument provides data from which it is possible to predict hearing loss from a five-year exposure to a particular noise level.

Gas Detector **458**
Draeger Oxygen Apparatus Corp. Four-page bulletin describes detector unit used for tracing and determining gas concentrations. Air is forced through a tube, containing a reagent, by means of a gas sampling pump. In addition to applications, bulletin contains a chart of various poison gases and vapors which can be determined, and the range of indication for each.

Air Sampling Equipment **459**
Gelman Instrument Co. 44-page publication gives complete specifications, operating characteristics and prices for new equipment designed for dust surveys, air pollution analysis, sub-micron filtration apparatus and radiation protection. Equipment includes sequential samplers, vacuum pumps, various filters, etc.

FIRE PROTECTION

Extinguisher Chart **460**
Walter Kidde & Co. Handy chart supplies convenient tabulation of different types of fire extinguishers, the class of fire for which each is effective, operating instructions, capacity and Underwriters' classification, and recharging period.

Fire Fighting Apparatus **461**
Ansul Chemical Co. Colorful 19-page bulletin comprehensively describes various hand and wheeled engine extinguishers, including specifications and other pertinent data. Also detailed is information on piped extinguishing systems and fire trucks, as well as accessories and recharging materials.

PLANT MAINTENANCE

Sanitation Tests **462**
Puriten Chemical Co. Copies of three actual tests for custodians at three different levels of advancement are included in an 8-page Engineered Maintenance pamphlet. Each test consists of 20 true-false questions and three practical performance demonstrations.

Bonding Polyethylene Surfaces .. **463**
Morseo Products Div. This two-page technical service bulletin describes a new method developed for rendering polyethylene surfaces bondable with epoxy adhesives. The new method is pertinent to the encapsulation of electronic components and applications where bondable teflon was formerly utilized.

Floor Maintenance **464**
J. I. Holcomb Mfg. Co. Modern maintenance for thirteen different types of floors is described in a well-illustrated, 13-page booklet. Tested procedures for each type

(Continued on next page)

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Free Bulletins (Cont'd)

of floor are discussed fully. Types of floors include vinyl, vinyl asbestos, rubber, linoleum, asphalt tile, terrazzo, concrete, etc.

Snow and Ice Melter 465
Pace Products, Inc. Two-page bulletin describes chemical pellets which are said to melt ice and snow 36 times faster than salt. They retain their effectiveness for periods of 24 to 36 hours, are safe to handle, and leave no residue.

MISCELLANEOUS

Plant Protection 466
Detex Watchclock Corp. This two-color handbook is designed as a guide for everyone concerned with plant protection, from top management to guards and watchmen. Subjects covered include Selecting the Guard; What Every Guard Should Know; The First Round; The Last Round; First Aid; Intruders; Sprinkler Systems; Report Writing.

Vibration and Noise Control 467
The Korfund Co. 8-page booklet gives engineering specifications and performance data for 27 types of products for the control and measurement of machinery vibration, shock and noise. Installation photos show various equipment and tell how typical problems were solved. The relative merits of steel springs and organic materials as isolation media are explored. Booklet contains easy-to-read selector chart.

Safety Films 468
International Film Bureau, Inc. Short films dealing with such subjects as machine shop hazards, linemen's safety, artificial respiration, punch press guarding, etc., are briefly outlined in this four-page brochure. Color and black and white.

Swinging Die Enclosure 469
Junkin Safety Appliance Co. This four-page brochure discusses a die closure for primary press operations. The adaptable guard is easily adjusted to afford the operator complete protection and at the same time permit safe accessibility to the dies when necessary. Guard adjusts both vertically and horizontally. Several other new features are also outlined.

What's Your Problem?

- **Has an accident or fire interrupted production?**
- **Want to know how to prevent it?**
- **Do you need background information on equipment for industrial safety, hygiene, or maintenance?**

As a service to its readers, "Safety Maintenance" will arrange to supply manufacturers literature on the following subjects. Just insert the key number on the Readers Inquiry Card on the preceding page and be sure to fill in your name and address. If you need information on a specific type of product, simply write it in on the Inquiry Card.

Number Key	Subject
	PERSONAL PROTECTION
101	Safety Goggles
102	Face Shields
103	Lens Cleaning & Anti-Fogging Equipment
104	Sweat Band
105	Hard Hats
106	Respirators & Masks
107	Protective Clothing
109	Safety Belts
110	Safety Gloves
112	Anti-Slip Soles
113	Oil-Resistant Soles
114	Welding Helmets
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127	Burn Medication
128	First Aid Kits & Supplies
129	Stretchers & Litters
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130	Throat Medication
131	Eye Wash Fountains
131A	Emergency Showers
132	Portable Ventilators
133	Dust Collectors
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137	Noise Mufflers
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141	Safety Cans
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146	Asbestos Textiles
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	LIGHTING AND WARNING DEVICES
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	MAINTENANCE
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163	Floor Cleaning Machines
164	Floor Resurfacing Compounds
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168	Ultrasonic Flaw-Detector
169	Machine Motion Analyzer
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173	Work Platforms
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	EDUCATIONAL AIDS
191	Safety Signs
192	Safety Awards & Emblems
193	Employee Safety Guide
195	Changeable Letter Signs
197	Safety Training Films

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U. S. and Canadian $4 (two years $6)
Foreign $5 (two years $8)
Single issues 50¢. Also quantity rates

Safety Maintenance

formerly "SAFETY ENGINEERING"

Volume 121, Number 1 **January, 1961**

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Cover picture by courtesy of Mine Safety Appliances Co.

AMERICA'S PIONEER INDUSTRIAL SAFETY MAGAZINE

Published monthly by Alfred M. Best Company, Inc. Publication Office, Columbia Turnpike, Box 232, Rensselaer, N. Y. Editorial and General Offices, Best Building, 75 Fulton Street, New York 38, N. Y. Second-Class Postage paid at Rensselaer, N. Y. Subscription rates: $4.00 Per Year in the United States; $4.00 in Canada; Foreign $5.00. Single Copies, 50 cents.
Postmaster: please send change-of-address notices to: Safety Maintenance, Best Building, 75 Fulton Street, New York 38, N. Y.

● SILICOSIS

Tremendous strides have been made by manufacturers of personal protective equipment as well as industry in general in helping to prevent silicosis and allied lung diseases, once the scourge of miners in far too many sections of the country. However, even today silicosis presents a graphic picture associated with mining, rock crushing, quarrying, masonry and related activities.

In reality, it must be re-emphasized that those engaged in working in and around foundries likewise can be exposed to the dread hazard of silica dusts. While foundry workers exposed to the possibility of silicosis numerically represent a far larger total than management may realize, it is fortunate that there is a mild degree of severity if and when this occupational disease is contracted. Nevertheless, foundry workers need the same protective measures if we are to prevent serious respiratory troubles.

The chief danger of silicosis is the predisposition to tuberculosis. Silicosis is a slow, often insidious development without the sudden or dramatic aspect of a lost eye or hand. Tragic though it is, even the total loss of vision or the amputation of an entire hand in an industrial accident need not be fatal. On the contrary, silicosis can be a torturous prelude to death.

Silica dust produces fibrous tissue in the nature of scars on the lungs. The prospect of complete recovery, especially in advanced cases, is still remote. Financially, the costs of this disease have shown the impact of inflation, especially in the matter of compensation because it means a slow, uphill fight even in the fortunate event of arresting or curing silicosis.

Emphasis, therefore, must be placed on prevention through protection to lessen the frequency and severity. Pre-employment examinations including full x-rays are needed to screen out those who, either by previous history or susceptibility, require protection against protracted exposure to harmful dusts. Mature workers should have such examinations at frequent intervals during their period of actual employment as they present more of a problem than younger, and presumably more robust, industrial workers.

Court calendars are already choked enough by pending legislation without throwing upon all concerned the tragic burden of silicosis. It is an economic as well as humane necessity to provide the ultimate in protection against the crippling and often killing hazard of silicosis.

It goes without saying that good housekeeping even in foundries always can be improved. Adequate ventilating systems engineered to actual requirements help to fight the incidence of silicosis and certainly, foundry workers need personal protective devices scientifically designed and produced by houses founded upon the all-important base of integrity and know-how.

Just as tuberculosis lends itself to treatment, so can we step up our efforts to prevent the lung-attacking danger which predisposes to that disease.

● THE BIGGEST "FIX"

If we are to judge by reports in the daily press, far too many Americans on the local, state and even national levels have a cynical approach to graft. Whether or not this is symptomatic of a deterioration in morality, only the professional moralists can determine.

Aside from a consideration of morals, one of the most potentially deadly types of "fix" is that which can lead to slaughter on our streets and highways. Every time a traffic fix is tolerated, either on the basis of influence or the outlay of cold cash, the safety crusaders are given a backward push. This is especially the case where the speeding factor is involved.

A man who boasts of his accomplishments in "killing" a traffic violation someday may be called upon to explain how he could kill a fellow-citizen.

Let's obey our traffic laws inspired by safety for human life. We then can leave the "fix" to narcotic addicts who, in practically every case, kill only themselves.

CONTINUITY COUNTS

33 YEARS IN SAFETY MAINTENANCE

America's Pioneer Industrial Safety Magazine

This Free Applicator Bottle of MERCURO-CHROME will convince you that it is the logical successor for First Aid Prophylactic and General Antiseptic Use—

MERCUROCHROME stains and it is the stain of Mercurochrome, that shows just where and how effectively the germicide has been applied; it fixes the bactericidal agent in the field for a relatively permanent period which prolongs the asepsis or the sterilizing effect, and it provides for demonstrable penetration into the tissues beneath the superficial surfaces. Inasmuch as Mercurochrome is definitely proved an extremely efficient general antiseptic, it is only reasonable to consider it the successor in this field, as it is free from objectionable features for *Mercurochrome does not irritate, burn or injure tissue.*

Sell yourselves first with this free sample:

HYNSON, WESTCOTT & DUNNING
BALTIMORE, MD.

HYNSON, WESTCOTT & DUNNING
Dept. 1, Baltimore Md.
Please send me free Mercurochrome Applicator Bottle for personal use.

Name .....
Company .....
Address .....
.....

H W & D Advertisement—January 1928

Thantis®
LOZENGES
first aid for throat irritations
THANTIS® Lozenges prevent lost man hours due to sore throats caused by coughs or colds.
THANTIS Lozenges do not produce unfavorable reactions in the mouth, because they contain no antibiotic.
THANTIS Lozenges act prophylactically to ward off infection.
THANTIS Lozenges have a twenty-nine year record of proven safety and effectiveness in clinical and lay use.
Mercurochrome®
First aid for wounds
MERCUROCHROME should be used promptly to prevent infection. No antiseptic has been proven to be more effective than MERCUROCHROME for topical application.
HYNSON, WESTCOTT & DUNNING, INC.
Baltimore 1, Maryland

H W & D Advertisement—January 1961

CONTINUITY BUILDS SALES

Continuity of ethics, integrity, product and advertising. . . . all 4 must be maintained to build a continuing rise in sales.

As pioneer developers, producers and marketers of many leading pharmaceutical products such as MERCUROCHROME and THANTIS Lozenges, the internationally known Hynson, Westcott & Dunning, Inc., of Baltimore long ago discovered the power of the "Big 4 of Continuity." Without a single break in this magic continuity, H W & D, Inc., has spread its message month by month in SAFETY MAINTENANCE to build and maintain its increasingly effective sales program in the medium that reaches—and holds—the heart of the safety industry.

SAFETY MAINTENANCE has helped to make MERCUROCHROME industry's household word not only by providing an expanding market to pinpoint industrial sales . . . but by opening other doors for H W & D, Inc., salesmen with a dynamic Reader's Inquiry Service.

Learn how your company too can profit every month by adding the 4th factor of continuity in SAFETY MAINTENANCE—your growth potential can be given an added spurt NOW!

Write Advertising Department for brochure

SAFETY MAINTENANCE

America's Pioneer Industrial Safety Magazine
Est. 1901

Coverage Through PAID Circulation

75 Fulton St., New York 38, N. Y.

Mr. Fanshaw had a *Space-Age* Problem

Mr. Fanshaw was concerned over the conquest of space. Actually, it was lack of space that disturbed him.

His store room was jammed to the gills with drum upon drum of Floor Cleaners. One for asphalt tile, one for rubber, another for terrazzo floors. Sometimes labels peeled off or became illegible and a cleaning crew used the wrong drum. Then Mr. Fanshaw *really* had a problem.

TEXINOL to the Rescue

One day a LEGGE Man called and suggested he use TEXINOL, the *one* Cleaner that does a bang-up job on *all* floors. TEXINOL is recommended for any surface that can't be harmed by water. Besides all types of flooring, that includes metal cabinets, tile walls, lavatories and office furniture. Leaves no soapy film. Needs no rinsing. Can't scratch or mar.

Like other Maintenance Chiefs in leading hospitals and industrial buildings, Mr. Fanshaw now uses TEXINOL *exclusively*. His space problem is solved. What's more, he has the cleanest floors in town! Get the full story on TEXINOL from your LEGGE Floor Specialist. No obligation. Or clip the coupon today.

Walter G. LEGGE Company, Inc.
Dept. F-1, 101 Park Ave., New York 17, N. Y.
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LEGGE SYSTEM of Safety Floor Maintenance

Send full information on Texinol, the all-purpose Cleaner.

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Hospital_____

Address_____

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SEE US AT BOOTH 406, PLANT MAINTENANCE SHOW
(For details, use Key # A-1 on card on page 1)

▸ THE FUTURE SHOWS ▸

Chicago, Ill. *January 23–26*
12th National Plant Maintenance & Engineering Show and Conference (International Amphitheatre). Clapp & Poliak, Inc., 341 Madison Ave., New York 17.

Dayton, Ohio *February 8*
9th Annual Miami Valley Safety Conference (Biltmore Hotel). Fred H. Lewis, Staff Director, Dayton Area Chamber of Commerce, Biltmore Hotel, Dayton 2.

Los Angeles, Calif. *February 9–10*
11th Annual Governor's Industrial Safety Conference (Biltmore Hotel, Los Angeles). Michael Flagg, Coordinator, 455 Golden Gate Ave., San Francisco, Cal.

Philadelphia, Pa. *March 1–2*
27th Regional Safety-Fire Conference & Exhibit (Bellevue-Stratford Hotel). Harry H. Verdier, Executive Director, Safety Council, Chamber of Commerce of Greater Philadelphia, 121 S. Broad St., Philadelphia 7.

Atlanta, Ga. *March 5–7*
22nd Annual Southern Safety Conference & Exhibit (Atlanta Biltmore Hotel). W. L. Groth, Executive Director, P. O. Box 8927, Richmond 25, Va.

Fort Wayne, Ind. *March 14–15*
1961 Northeastern Indiana Safety Conference & Exhibit. Ivan A. Martin, Manager, Safety Council, Chamber of Commerce Bldg., Ft. Wayne, Ind.

Los Angeles, Calif. *March 28–30*
8th Annual Western Safety Conference & Exhibit (Ambassador Hotel). Joseph M. Kaplan, Manager, Greater Los Angeles Safety Council, 3388 W. 8th St., Los Angeles 5, Calif.

Boston, Mass. *April 3–4*
40th Massachusetts Safety Conference & Exhibit (Hotel Statler Hilton). Bert Harmon, Manager, Mass. Safety Council, 54 Devonshire St., Boston 9, Mass.

Toronto, Ont. *April 10–11*
44th Annual Meeting & Safety Show of the Industrial Accident Prevention Associations (Royal York Hotel). R. G. D. Anderson, Manager, Industrial Accident Prevention Assocs., 90 Harbour St., Toronto 1.

New York, N. Y. *April 10–14*
31st Annual Greater New York Safety Convention & Exposition (Statler Hilton Hotel). William J. Farley, Convention Director, Greater New York Safety Council, 60 E. 42nd St., New York 17, N. Y.

Syracuse, N. Y. *May 1–3*
Central N. Y. Safety Conference & Exhibit (Hotel Syracuse). Greater Syracuse Safety Council of the Syracuse Chamber of Commerce, Syracuse, N. Y.

Boots that bear this label B.F.Goodrich XtraTuf won't slip when floors are slick

B.F.Goodrich XtraTuf Anklefit boot has non-skid outsole that keeps workers sure-footed on slippery floors

How to keep workers sure-footed on floors slick with oil, grease? B.F.Goodrich tackled the problem—designed, tested, rejected. The result of this intensive research is the B.F.Goodrich XtraTuf Anklefit boot with a non-skid outsole that gives terrific traction, foot security even on the most slippery floors. And the tough neoprene rubber used in these boots resists oil, greases, fats, acids which cause most rubber to break down—so BFG XtraTuf Anklefit boots far outlast other boots in this kind of service.

These BFG boots also last longer because they have no exterior seams—the place where most leaks start. Unlike ordinary boots which are made with sections of rubber joined together at seams the XtraTuf Anklefit boot has its skin "dipped" on, just like taffy is dipped on an apple. It's completely covered with a thick, seamless layer of neoprene.

B.F.Goodrich XtraTuf neoprene footwear comes in regular and anklefit boots, industrial work shoes with plain or steel safety toes, and are also available in an over-the-shoe style. For full information and a catalog, call your B.F.Goodrich distributor, or contact *B.F.Goodrich Industrial Footwear, Dept. M, Watertown 72, Mass.*

INDUSTRIAL FOOTWEAR BY B.F.Goodrich

NEWS FROM AO

R-5091P respirator is shown in combination with 701 goggles. R-5051P respirator is also available.

New safety for paint spray operators

Just approved by the U.S. Bureau of Mines . . . this new AO paint spray respirator protects against sprays and vapors of enamels, lacquers and lead-based paints. If you're now using any of the AO R-5000 series respirators, you don't need a new face mask, not even a conversion kit. Just replace the cartridges with either of two approved new units, and get maximum protection.

This new AO paint spray respirator is compact, light in weight, combines maximum efficiency and service life with ease of maintenance. It is one of 17 combinations possible with the R-5000 series. By simply interchanging filter units in one basic face piece you protect against a range of hazards, including mercury vapors, highly toxic insecticide and radioactive dusts.

For further information on any R-5000 respirator model, contact your nearest AO Safety Products Representative, or write for folder S-1297.

Your Surest Protection . . . AO SURE-GUARD Respirators

American Optical
COMPANY

SAFETY PRODUCTS DIVISION • SOUTHBRIDGE, MASSACHUSETTS

(For details, use Key # A-3 on card on page 1)

Keep Safety in Sight

Every man at the plant knew the rules about wearing safety glasses. It was the most natural thing in the world for Jim Ross to stop at the Supply Room for his "working glasses" before reporting at his work bench.

But the goggles were uncomfortable. They didn't fit right. Jim Ross stuffed them into his back pocket . . . and threw the switch to start his machine.

Minutes later, flying metal particles—that should have been deflected by safety lenses—riveted

themselves hotly in the machinist's eyes. Jim Ross was blinded.

In a near-by research center, chemist Ernest Barlow suffered severe eye injury . . . from noxious laboratory fumes. Intense, unshielded light was blamed for the damage done to the eyesight of Cliff Hone, welder.

Each man had protective glasses, supplied by his company . . . but wasn't wearing them at the time of the accident!

One shipyard employs 20,000 men whose work requires safety glasses. The staff optometrist produced records showing that each year 7,000 of these glasses had to be replaced. Why?

Cast-off goggles and eye shields told the story. They were broken, pitted, scratched or burned . . . 7,000 pairs.

Imagine the wholesale tragedy this company would have on its conscience . . . if well-fitted safety lenses weren't available, and the pitting, scratching and burns were etched, instead, on 7,000 pairs of human eyes!

The American Optometric Association says—if the glasses fit the worker, he'll wear them. Then where does the fault lie?

Stock glasses which are not fitted properly . . . goggles designed for one hazardous operation, forced on workers with different needs . . . management neglecting to enforce the rules about eye protection—these are the culprits.

Safety engineers estimate that 98 percent of all eye injuries could be prevented. How?

Industry has to open its eyes—to workers' vision. This isn't altogether a humanitarian proposition for management. Time lost through accidents . . . higher pay demanded for jobs where eye injury is frequent . . . the permanent loss of a well-trained worker—mean setbacks in production, and a cutback in profits.

Look at the company's health records. Mark high spots of danger to workers' vision. What plant operations—grinding, crushing, pounding, chipping, scaling, mixing, sawing, riveting, slicing, cutting, planing—call for protective lenses? Where are toxic dust, fumes, mists, or hazardous liquids a threat?

An increasing number of major industries are giving more and more attention to eye safety and have well organized vision programs. A number of other companies have moderately good programs and are now developing vision conservation programs as recommended by the American Optometric Association and using the full-time services of optometrists. Many small companies are beginning to enlist the aid of optometric consultants; others still remain who do not have any vision program.

Why call in a professional?

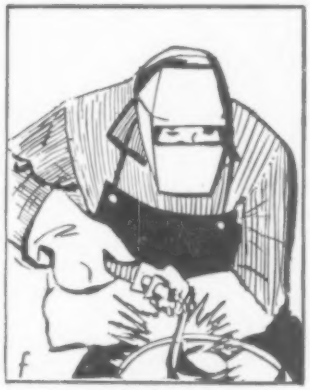
The shop foreman knows machines . . . not eyes. The safety engineer knows how to reduce hazards . . . not how to prescribe lenses. The supply clerk knows how to sort goggles . . . not how to fit them.

An optometrist will study the visual task. Is the working distance 8″, 30″, or 20′? Does the patient need correction for more than one distance? Is the task at eye level, high, or low . . . and what are the hazards encountered?

The patient's eyes will be examined as thoroughly and with more painstaking care than for ordinary "street glasses." What is the exact lens formula for each eye? Are the eyes free of pathology? What are the facial measurements, pupillary distance, decentration? (Remember the statement made by the American Optometric Association: if the glasses fit the worker, he'll wear them!)

The materials for the lenses and frame are chosen—in the light of

(Continued on page 21)



Are

SANITATION SERIES
other articles Feb. & March

Dry scrubbing machine has 32-inch wire brush which cuts grease deposits which might not be picked up by wet scrubbing.

Cleanliness is vital to industry and industrial housekeeping programs are immense in scope. In order to be a good place to work, an industrial firm must be a clean place to work, for cleanliness is a prerequisite to keeping work areas safe, healthful and pleasant. The job is not limited to spring cleaning. It's a year-round proposition and an expensive one.

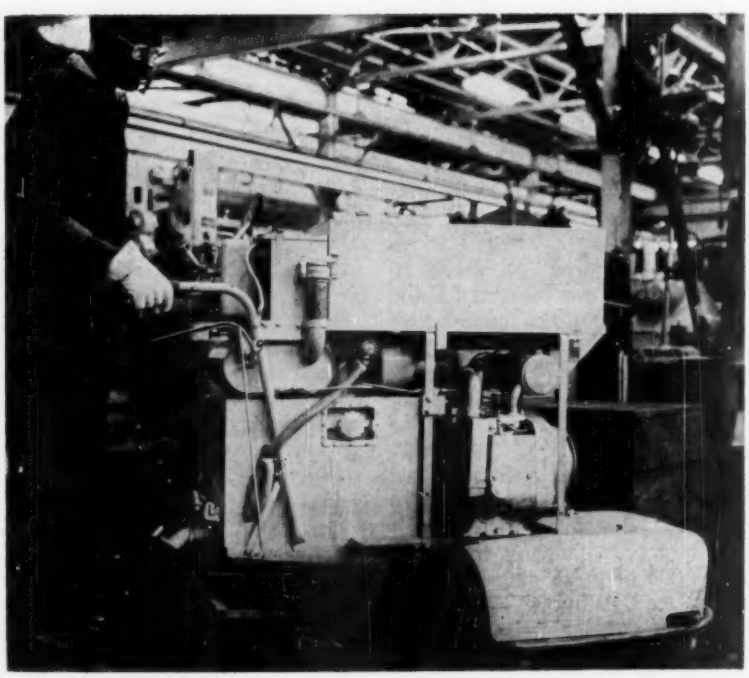
Manufacturers like The Timken Roller Bearing Company spend millions of dollars annually to keep grease, oil, furnace smoke, steel chips and other waste material from accumulating in work areas.

In 1959, the Timken Company's cleaning bill for its plants in the United States and Canada was $2¼ million. That's a lot of scrubbing with a lot of soap.

Broken down into plant city locations, $1,082,930 was paid to keep the Canton bearing factory and steel mill clean and $135,000 was spent for cleaning the Canton General Offices. The Columbus plant spent $449,734 for cleaning purposes; Bucyrus spent $91,864; Wooster, $29,484; Colorado Springs, Colorado, $22,659; New Philadelphia, $6,911, and St. Thomas, Ontario, $63,330.

Why is it so costly? At the Timken Company, there are two basic answers: volume of cleaning to be done and frequency of cleaning necessary to guarantee safe and pleasant working conditions 24 hours a day.

With respect to volume, the cleaning of windows is a good example. There are approximately 60,000 panes of window glass to be cleaned at the Canton, Bucyrus and New Philadelphia plants. This does not include the windows in the factories and mills. In addition, there are about 4,000 inside office parti-



This wet scrubbing machine cuts grease from factory floors. Squeegee on rear of machine disposes of the dirty water.

Cleaning Costs Too High?

A good sanitation program costs money—lots of it—but the real cost must be measured in terms of safety and efficiency.

tions, with about seven panes of glass per office, which must be washed regularly at these plants.

Floor Sanitation

Consider the frequency of sweeping and scrubbing. Perhaps the most important cleaning job, certainly one of the most necessary to personal safety, is the sweeping and scrubbing of factory aisles and machine areas. At all Timken Company plants, these areas are cleaned continuously. Sanitation Department workers at the Columbus plant maintain and clean a total area of 489,612 square feet. If grease, oil or steel chips were allowed to accumulate, accidents could be caused—employees slipping on aisleways or cutting their shoes on sharp chips.

Operations at the Canton and Gambrinus plants encompass even larger areas. The Sanitation Department at the Canton and Gambrinus bearing factories and the Canton General Offices is made up of a staff of 140. Their duties are many and varied and are as important to the functioning of the company as any production operation.

Lynn J. Bole, an equipment operator of company's Recreation Park, keeps lawns trimmed with this tractor-type mower.

Cleaning sludge from grinding machines, removing waste paper and other soiled materials, keeping receptacles empty and in their place, removing chips from Tool Room machines, cleaning and keeping rest rooms supplied and many other jobs of similar nature demand the time, hard work and efficiency of a well-trained staff. There are 45 rest rooms and wash rooms that must be maintained in the Canton bearing factory alone.

The Steel and Tube Division's Canton and Gambrinus facilities include 54 men's combination locker

(Continued on page 20)

Charles Colvin operates company's street sweeping machine. Big rotary brush disposes of refuse in rear machine chamber.

INDUSTRY'S WATCHDOG:

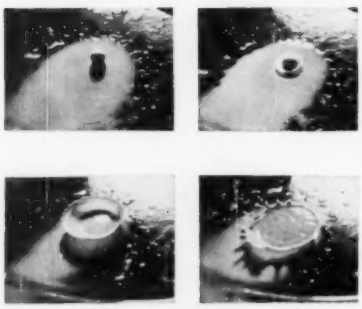


Fig. 1 It's just a drop of milk hitting a metal plate, but the stroboscope slows action, shows nature's delicate beauty.

Fig. 2 In automotive laboratory, stroboscope permits detailed study of fuel-injection spray patterns. The flashing light "freezes" high-velocity droplets in atomized spray, permitting study of the range and size of these droplets.

Fig. 3 Engineer at Sell 'N Serve dispensers uses stroboscope to study action of cooling fan in a beverage dispenser.

by **FREDERICK T. VAN VEEN**
General Radio Company
West Concord, Massachusetts

What do you do when a high-speed machine operates erratically? If you shut it down, everything looks fine; when it's running, things are moving too fast for you to see. If only you could watch the high-speed action in slow motion!

Many experienced safety, design and maintenance engineers, faced with the above problem, would answer, "Get a stroboscope!" For the stroboscope does actually give the user slow-motion vision. Machines running at speeds up to a quarter of a million revolutions per minute are prey to the flashing eye of the stroboscope, one of the most useful devices available to anyone who works with machines.

The stroboscope, in one form or another, has been around for many years, but improved, bright-light, high-speed models are now invading new fields every day. Undoubtedly, to many readers the stroboscope is an old friend. For those unfamiliar with this instrument, here is a brief explanation of what it is and how it works.

A stroboscope is basically a light that can be flashed on and off at very high rates—many thousands of times a minute, in fact. If you aim such a light at any device that moves cyclically (i.e., that repeats the same action over and over, as does a fan or a piston), and if you make the light flash at the same rate as the object is moving, the result is an interesting and very useful optical illusion: **the object appears to be standing still!** It is very easy to see why this is so. During one flash of the stroboscope, the object is in a certain position. Then the light is off while the object continues its travel. When the stroboscope comes on again, the object is just where it was during the last flash. It all happens very fast, and the retentivity of our eyes helps to promote the idea that the object isn't moving at all.

If the flashing rate is offset slightly from the speed of the object, the object appears to move in slow motion. A stroboscope flashing at, say, 1749 times per minute causes a 1750-rpm fan to appear to rotate forward at one revolution per minute. This is the "slow-motion vision" that is so helpful in machinery trouble-shooting, for the apparent slow motion is a faithful reproduction of the actual high-speed motion, including any of its faults.

Versatile Instrument

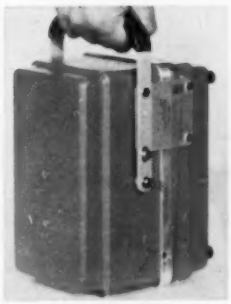
Slow-motion observation is one of two broad purposes the stroboscope serves. The other is speed measurement, and some stroboscopes are referred to as stroboscopic tachometers. To measure speed, the stroboscope user simply adjusts the flashing rate until the moving device appears to stop, then reads the speed on the accurately calibrated stroboscope dial.

Given such a powerful tool as the basic stroboscope, engineers have dreamed up new techniques and

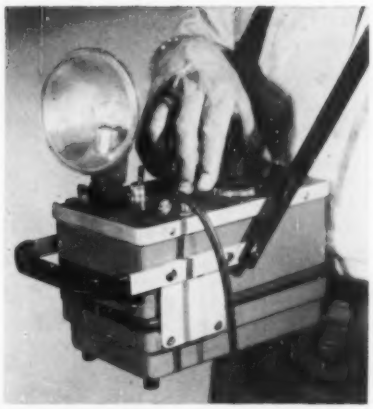
Figs. 4 and 5 A shake table and shock mount are merely a blur (as seen at

THE STROBOSCOPE

applications by the hundreds. Using harmonic techniques, for instance, one can measure speeds up to 250,000 rpm with a stroboscope that flashes at "only" 25,000 rpm. The split-second flash of a stroboscope has opened up the dramatic science of high-speed photography. Mechanical contactors and other external devices are used to synchronize the stroboscope's flash with such curiosities as a cobra's strike, a bullet's impact, and the movement of a human eye. No one could amply describe all of the uses of a stroboscope; theoretically, there are as many uses as there are things that move repetitively. The stroboscope is used by researchers, machine designers, photographers, maintenance engineers, and almost anyone with any reason for studying motion. The accompanying illustrations show some of the countless things you can do with a stroboscope.



Above and right: This recent stroboscope stows away in a clever carrying case which, during operation, can be converted into easel-type stand.



New model stroboscope has an adjustable neck strap. This frees operator's hands for performance of other tasks.

Measuring the Speeds of Fractional-Horsepower Motors: It is often difficult to measure the speed of low-power devices with conventional mechanical tachometers, because the load of the tachometer alters operating conditions. The stroboscope, on the other hand, requires no mechanical connection to the device. (The one-percent accuracy attainable with a stroboscope is better than that of most mechanical tachometers, too!) Typical measurements on fractional-horsepower motors determine normal operating speed, speed variation with changes in line voltage, speeds at various conditions of overload and underload, torque-speed characteristics, and critical speeds where vibration occurs. By slow-motion observations, brush action can be studied, and chattering caused by commutator eccentricity as well as vibration of frame and parts can often be detected.

left) until the stroboscope is pressed into service (with result shown above).

A simple technique enables the stroboscope to measure torque. When the motor and load shafts are connected by an elastic coupling, and the rotational motion is "stopped" by the stroboscope, the position of a pointer on the spring coupling will change as the driven shaft is loaded. Add a calibrated scale to the pointer, and you have a torque meter!

Observing Operation of Large Machines and Engines: In the automotive and heavy-machinery industries the stroboscope is used to study spring surge, valve operation, the effect of flywheel mass on speed, piston-ring action, and vibration. For the study of reciprocating parts in an internal-combustion engine, a window is cut in the side of an experimental engine and the stroboscope is triggered by a contactor connected to the crankshaft. (Such mechanical contactors are often used when the speed of the device to be observed is not constant. The contactor is merely a switch that sends an electrical triggering signal to the stroboscope when the moving device is at a certain position.)

Fuel-spray nozzles for diesel engines are also inspected under the stroboscope's light. The bright, short-duration flash permits close study of rapidly moving parts and of the formation of fuel-injection spray patterns. The stroboscope "freezes" the high-speed droplets in the atomized spray so that droplet size and range can be observed. (See Figure 2).

Designing and Maintaining Fans, Blowers, etc.: Another neat trick is the use of chemical smokes so that

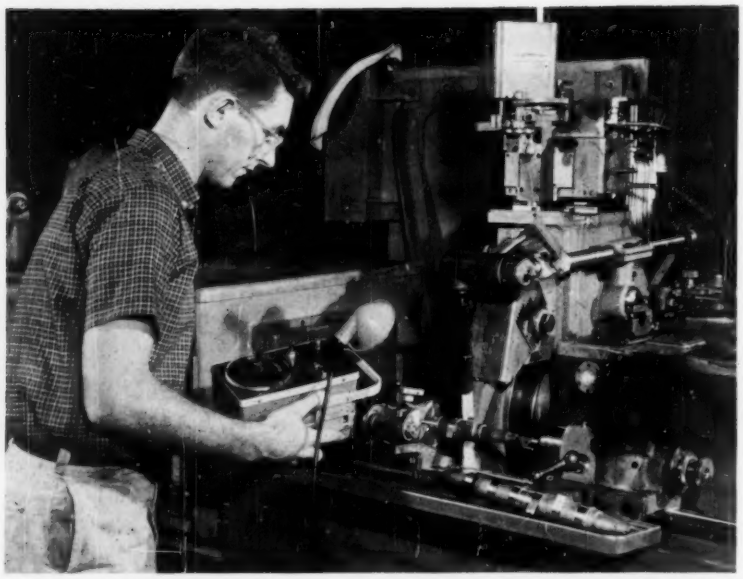


Fig. 6 Every movement in the operation of an automatic camshaft grinder is under the observation of this stroboscope at Norton Company's plant.

the stroboscope can be used to watch air currents produced by fans and blowers. A designer of beverage-dispensing machines, for instance, uses a stroboscope and talcum powder to see how the air is moved around by a cooling fan. (See Figure 3). If the cool air is not aimed straight at the beverage, he makes the necessary adjustments on the spot.

Many blower manufacturers use the stroboscope to study vibration, so important in the design of a blower and its mounting. With the stroboscope, various types of shock mounting can be tried, with the effectiveness of each clearly visible to the designer.

Manufacturers of air-moving devices also use the stroboscope to conduct structural analyses. Blade resonance of developmental units are detected while the units are vibrated on shake tables. Fans that must work at high altitudes or push heavy gases are placed in special environmental chambers and observed under stroboscopic light.

Vibration Studies: Vibration is increasingly recognized as the culprit that causes much objectionable noise, structural fatigue, and component damage. Not only can the stroboscope easily measure the frequency of a vibration, but, with the aid of a microscope and cross hairs, it can be used for accurate displacement measurements. This technique is used by automotive and aircraft engineers to measure crankshaft whip, vibrations, and turbine-blade displacement.

The stroboscope and the shake table are an effective team in the study of the effects of vibration. The equipment to be tested is secured to the shake table, then watched as it is given its shake test. The stroboscope's light lets the user see for himself exactly what goes on under such conditions. (See Figures 4 and 5.)

Industrial Maintenance: At a trade show recently, one skeptic saw a stroboscope demonstration and then remarked, "Very interesting, but I don't see any use for it in my plant." The answer, from an engineer familiar with the great versatility of the stroboscope, was a pithy "How come? Doesn't anything move in your plant?" And indeed it is hard to see how any manufacturing operation could find no use for a stroboscope to help maintain its machinery. The maintenance man with a stroboscope in his hand has a head start on trouble. He can see signs of misalignment, wear, dangerous unbalance, and harmful vibration while the machines are running—**before** they break down. (See Figure 6.) In many textile mills, for example, stroboscopic checks of shuttles, knitting machines, spindles, bobbins, and frames are part of the daily routine. Quick speed measurements are used to detect belt slippage, need for lubrication, and other troubles that may slow down production or lead to breakdown. (See Figure 7.) It's easy to see that the stroboscope can pay for itself

(Continued on page 28)

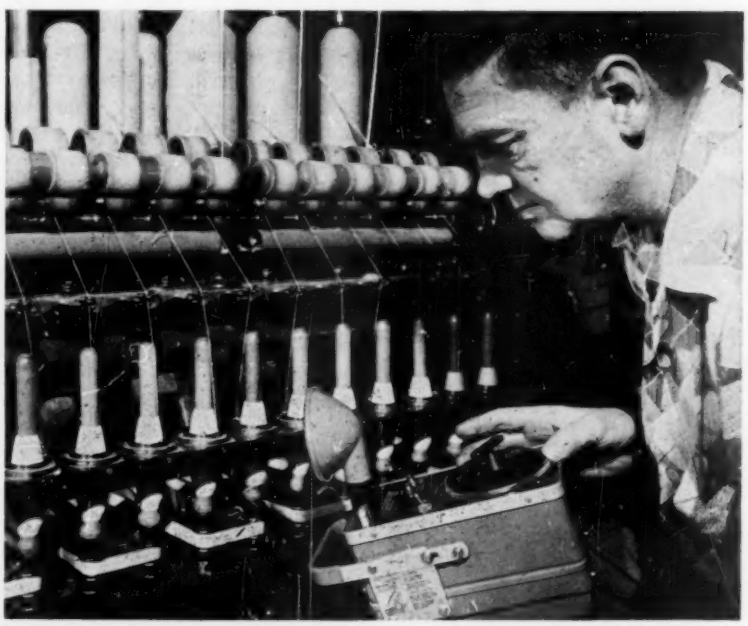


Fig. 7 Textile men everywhere know the stroboscope as the best bet to detect belt wear, slippage, other trouble in high speed machines that must keep going.

SAFETY POINTS TO EMPHASIZE

To keep up interest in a safety program and to help employees in their understanding of what your program is all about, it is necessary to repeat certain objectives over and over again and to emphasize the essential items of the program. The following points for emphasis were prepared by the Institute of Scrap Iron & Steel, Inc. Most of these points are equally applicable for underscoring in other types of industry. While individual companies will also want and need to make additions to the list, such as the importance of wearing personal protective equipment, the various items are presented here as a starter for a list of safety subjects requiring constant re-emphasis.

1. ACCIDENT REPORTING

While safety efforts are intended to prevent accidents, if they do occur, what reporting procedures have been set up? All employees and supervisors should be advised of the procedures, and everyone should be required to follow these procedures. Failure to report could cause complications; a cut may become infected; a hernia may be claimed at a later date; a burn may be aggravated. By insisting on immediate reporting of all accidents, you can see that the injured person is given proper medical care, AND steps can be taken immediately to eliminate the CAUSE OF THE ACCIDENT.

Arrangements should also be made for reporting illness and accidents off-the-job. If a man has been injured, or becomes ill, it may be hazardous for him to work in certain jobs until he has recovered.

2. SAFE SPEEDS

Speed has been termed as one of the worst killers. People drive too fast, run on stairways, and commit other hurried actions. Reaction time is the time lapse required for a message to be transmitted to the brain, then to the nerves and muscles through which we move. Too much speed causes things to happen faster than we can control them or get away from them. Sometimes, not enough speed can be equally hazardous. Somewhere in between are the safe speeds in which we can work with the least amount of hazard. Where men are working together, it is most important that they work at the same speed. A survey of your plant area noting the speed of cranes, trucks, shears, presses, and workers would be helpful in judging what speeds are the safest.

3. MACHINE GUARDS

Workers need to be told why machine guards are installed, why they must be kept in place, and what to do if the guards do not operate properly, or have been removed. There is no advantage in spending money for guards and having them inoperative.

4. HORSEPLAY

Just because "boys will be boys" is no reason for tolerating horseplay on the job. Many workers have been seriously injured—and some killed—through the pranks and practical jokes of a few people who think this type of action is funny. It is best to let all workers know that you will have **NO** horseplay in your plant. If a man is injured through horseplay, your company is responsible.

5. SAFE TOOLS

While most injuries from using hand tools are not as serious as other causes, they **can** be serious or they may lead to infection or inability to work properly. Those men who use hand tools should be instructed to use only tools which are in safe condition and to use them safely.

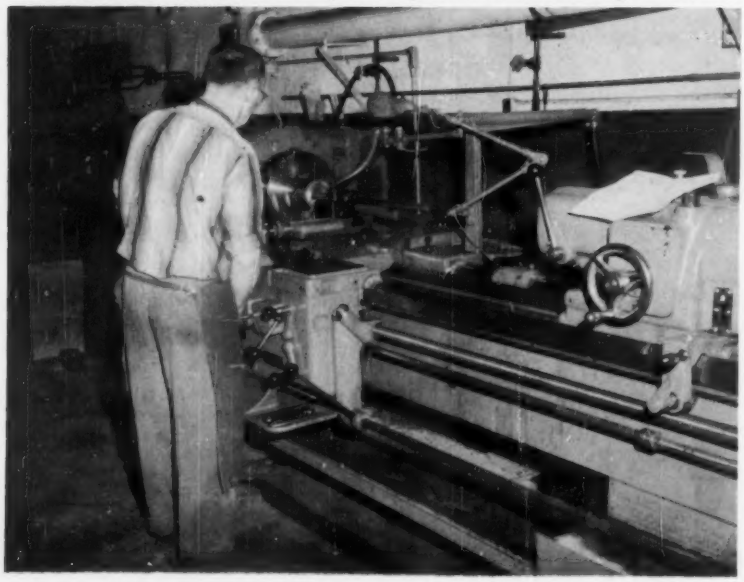
6. LOCKING OUT MACHINES

Employees should be instructed to stop machines before oiling or making repairs. For ideal safety conditions, anyone who is to repair or adjust machinery, get into a pit, or in any way be placed in a position where he might be caught if the machinery should move, should be instructed to make certain that the machine is "LOCKED OUT" so that it cannot be put into operation.

Picture by courtesy of U. S. Steel Corp.

SAFETY PROBLEMS IN MAINTENANCE

Here a group of electricians is busy with repair work on an underground cable.



Believe it or not, there is probably no other group in the plant any happier than maintenance people when plant equipment is running properly. They like to see the equipment operating smoothly, being used properly, and turning out the product. When repairs are required, they would like to do the job easily, quickly, and safely. Maintenance people have the normal dislike for working against a time limit, working under pressure and with others looking over their shoulders.

Maintenance work has its own hazards, working conditions, methods, and procedures. The installation and repair of equipment, maintenance of plant buildings and grounds, working with electricity, steam, liquids under pressure, compressed air, etc. expose maintenance men to a similar yet continually changing pattern of hazards and working conditions.

The over-all plant safety program should be supplemented by separate safety activity originating with maintenance management and supervision. This activity should direct intensive effort toward two major problem areas:

1. **The hazards involved in maintenance work.**
2. **The development and maintaining of a high level of safety awareness among maintenance personnel.**

In this picture the machinist is turning inside taper for a small steel roll.

PLANT

by **RICHARD T. WISE**
Manager, Maintenance Service
B. F. Goodrich Footwear & Flooring Co., Watertown, Mass.

These two areas are also basic problems in any safety program. They are particularly important in maintenance operations because of the nature of the work performed and the characteristics of the employees. Let's review how these problems apply to maintenance personnel.

1. Maintenance Operations Are Hazardous—

There are few occupations in industry as hazardous as the usual maintenance operation. Maintenance men are continually using hand tools or power tools, working in, around, on top of and under machinery. They work above ground on ladders, platforms, roofs, and staging; they work below ground in trenches, pits or tunnels. They use chains, wires, machines, drills, brushes, tools and wrenches of numerous types and sizes. The hazards are many and change with the job being performed. Each craft—the electrician, millwright, pipefitter, machinist, etc.—has its own particular dangers. Even the janitor is exposed to hazards in cleaning work.

The greatest hazard of the electrician is naturally electricity itself, but surprisingly few electricians are hurt from this source. Far more are hurt in falls from ladders than from shock. We have had two demonstrations of this in our plant in recent years. A former electrician is now doing maintenance clerical work as a result of a fall from a ladder several years ago. The back injury he received prevents him from performing electrician's duties.

Photo shows an attendant operating the control valve for compressed air lines.

He is quite unhappy because his present pay rate is less than that of an electrician.

More recently an electrician stood on a portable platform to remove a 1 HP motor from a storage shelf. He fell from the platform eight feet to the floor and fractured a shoulder bone. He has since recovered and returned to work.

The carpenters' greatest hazards are the power tools available for woodworking. These tools are wonderful aids for improved quality and quantity of work performed, but must be treated carefully. How many carpenters have you seen who are missing a finger joint or two? Here is a trade where injuries do occur in the area where we would expect, the fingers and hands.

Pipefitters receive serious burns from hot pipes, steam, and hot water. They handle piping for compressed air, water to 2500 p.s.i., and various other liquid materials. Theirs are the usual hazards of working in close quarters, of lifting, of pulling on wrenches from a cramped or strained position. Yet our Pipe Shop's lost time injuries of recent years have resulted from falls. One man slipped on an oily spot on the floor; the second stepped through a Celotex ceiling of a warming oven.

Sanitation Hazards, Too

Go through each of the crafts, and you will find numerous hazards that are part of the work of the millwrights, tinsmiths, machinists, oilers, etc. Go through the minor injury reports and you'll find numerous cuts, nicks, bruises, scraped skin, foreign bodies in skin resulting from working with tools and machinery. Janitors and matrons, in spite of wearing gloves, receive cut or jabbed fingers and hands from sharp objects thrown into waste paper containers. Wet floors being mopped, floors being waxed, and lifting of rubbish cans are daily hazards for these employees.

So, injuries often occur that are not directly connected with the hazards of maintenance employees' jobs. From experience and instructions, the men seem very much

aware of the dangers of their particular trade. Apparently they relax during the preparatory and cleanup phases of the job, or when going to and from various plant areas. This is when injuries often occur.

Can a man get hurt walking in the plant area? He certainly can! We had a lost-time accident when a janitor was walking to his regular job assignment at the rubbish disposal platform. His feet became entangled in a piece of baling wire on the road, he fell and fractured a rib.

Later a production employee walked between two small flat-bed trailers parked parallel to each other. A third trailer, parked at right angles to the first two, blocked the three-foot passageway between the two trailers. The employee did not see the third trailer, fell over it and fractured his arm.

So much for hazards in maintenance operations; there are plenty of them. Let's consider the second problem.

2. Maintaining a High Degree of Safety Awareness—

It is not too difficult to develop an initial awareness of job hazards and the use of safe methods among maintenance personnel. Maintenance men are a step above the normal factory worker in basic intelligence, independence, and ability to find solutions to problems. Craftsmen already recognize many of the danger spots in their jobs, and are receptive to efforts made to re-emphasize these hazards and point out new ones.

The difficult task is to maintain, to a high degree, the safety attitude and the awareness of job hazards that has been developed. This requires continual, persistent effort until the new attitude and higher level of awareness becomes a habit with each man. Many an old-time craftsman has performed a particular repair job in a certain way for a number of years, and nothing has happened. Now we tell him his method is unsafe. If he is independent enough (and maintenance men can be quite independent), stubborn enough (we all have our share of men with this characteristic), or the selling job is not good enough (we may "goof," too), he will continue with the old method. Some day either he or his buddy will be caught; a near miss or a serious injury will result. Then he'll be convinced.

Tied in with this development of a safety awareness is a basic characteristic of men. Men are show-offs; many men are would-be supermen. The National Safety Council has statistics to show that seven out of ten persons who die in accidents are males. Thirty years ago the average white female lived three years longer than the average white male; today she can expect to outlive her man by more than six years. The male is the one who normally tackles the more hazardous job, who will be less careful, who will drive himself a little harder, who will take a little more of a chance at both work and at play in order to accomplish whatever he sets out to do. Call it aggressiveness, drive, show-off tendency or whatever you will; it is a characteristic of men that makes a safety awareness program more difficult.

These then are the two major problems facing a safety program for maintenance personnel: (1) Hazards of the trades, and (2) maintaining a safety awareness. We have a three-part program at work on these problems. We feel that this program is in a similar position as the undertaker, who wired a man and informed him of the death of his mother-in-law. The undertaker asked if the deceased should be cremated, embalmed, or just buried. After a short time he received the following answer, "Do all three. Don't take any chances."

In our three-part program we do all three. We don't take any chances. This program consists of:

Part 1—Safety Letter—Every 6–8 weeks we prepare a letter for distribution to each member of the mechanical shops and sanitation department. The subject matter is **always** some phase of employee safety. One letter may call attention to unsafe acts or conditions that appear on the minor injury reports; another may outline some phase of tool safety; another letter may recognize an excellent record in one or more shops; another letter may emphasize off-the-job safety. This last subject is particularly applicable at Christmas time and during the summer vacation months. The letters have caused both favorable and unfavorable comment. They perform two important functions:

a. They direct attention to some phase of safety that pertained to each employee, his department, and fellow worker.

b. They help indicate to each employee the interest of supervision and management in safety of employees, both on and off the job.

We have no way of knowing the effectiveness of these letters as they are a part of our over-all program. At the Akron plant, the letters were mailed directly to the home of each employee in the maintenance organization. This enabled the employee's family to become aware of the safety program and perhaps exert an influence on the employee. At the Watertown plant, the supervisors distribute the letters to the employees. This seems to work satisfactorily.

Several of our shop supervisors supplement these letters with their own bulletin board posters. They watch newspapers and magazines for pictures of industrial accidents. When a suitable picture is found, the supervisor decides on the poster wording, and we prepare a safety poster using the picture as the central point. One electric shop poster caused considerable comment among all shop personnel, even though it pertained to an injury on a high voltage electric power line.

Part 2—Supervisor's Safety Meeting—Safety meetings of 45 minutes duration are held once a month for maintenance supervisors and foremen. A meeting program is built around a review of minor injury reports, lost-time injuries, if any occurred, and discussion of specific hazards in maintenance operations. From time to time, one of the supervisors is asked to prepare a short presentation on a subject of his own choosing and to lead the discussion. This requires him to do some study on a phase of maintenance safety, and provides him with practice in leading a discussion. Safety films and supervisory training type films are sometimes used as part of the meeting program. Occasionally representatives of equipment suppliers instruct the group in the proper and safe

use of the maintenance shop tools and equipment. We devoted part of one meeting to a "brainstorming session" on certain plant safety hazards. Each meeting has two objectives: To obtain maximum participation of supervisors and foremen, and to provide them with information on a specific subject that they can use in their daily contact with their men.

Part 3—Personal Safety Contacts—Each supervisor and foreman has instructions to contact two of his men daily on some aspect of safety. Observation of the man's handling of tools, work method being followed, proper use of protective equipment as goggles, shoes, masks, gloves, etc., provide subject matter for a safety contact.

Knowledge of the man's off-the-job interest such as boating or camping, provides an opportunity to mention safety points along these lines. The supervisors encourage the men to think about and look for better methods or better tools to do certain repair jobs. This is always a good subject for a safety contact. A better method or better tool will usually enable the man to do the job safer, easier, and faster.

The most effective part of any safety program is frequent personal contact of each employee by his supervision. The key to any successful safety program is the interest and efforts of first-line supervision. This means that the supervisor himself must sincerely **believe** in safety. This means that the supervisor must set the **example** by his own actions. This means that the supervisor must provide **enthusiasm** for safety. Only then can he put the message across to his men. Our job is to be sure that **we** sincerely believe in safety, that **we** set a good example by our actions, and that **we** have our own frequent personal contacts with the men we supervise. Safety contacts, safety selling and safety emphasis must be an unbroken chain between all levels of management, supervision and employees.

This is our three-part program for maintenance personnel. It supplements plant-wide safety activity. This type of program is not new or startling, but persistent and continual effort will make it effective. The equipment side of safety, such as proper tools, guards, protective equipment, etc., are important and are given considerable attention by the supervisors and foremen. Major emphasis, however, is placed on the development and maintenance of a safety attitude, of positive thinking toward safety hazards, of a safety awareness among supervisors, foremen and employees. This is the more difficult yet the more rewarding task.

The dollar cost of injuries receives its share of attention in the supervisors' monthly meeting and occasionally in a safety letter sent to all maintenance employees. This cost is translated into dollars of sales that our company salesmen must obtain to cover the injury cost, perhaps in terms of new equipment for the maintenance shops that the injury cost represents, or into any other terms that we feel make an impression on the employees.

Does this type of program work? Yes, it does. Several years ago at

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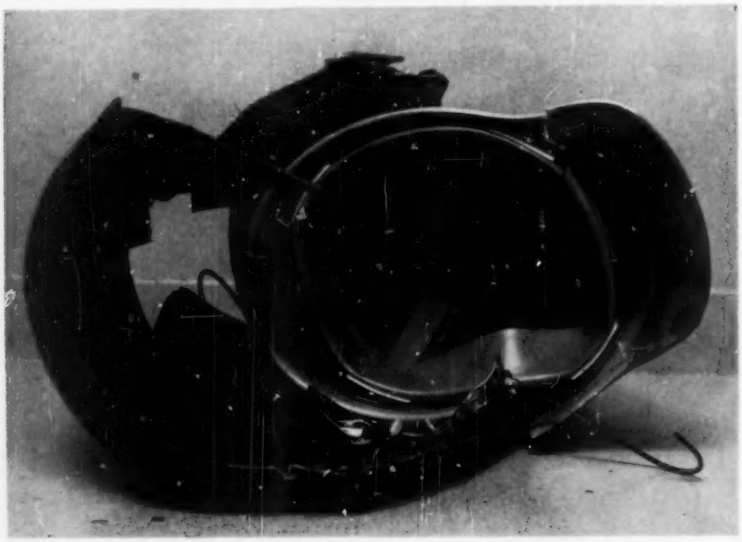
the Akron plant my group of 160 maintenance employees had five lost-time and 87 minor injuries between January and middle September. One pipefitter died from internal injuries ten days after his accident. This same group, after the program outlined above was started, went 14 months before the next lost-time injury occurred. At the Watertown plant this program was begun in early 1958 for 315 maintenance employees. Comparing the year 1958 with 1957, minor injuries dropped 21 percent from 348 to 277; lost-time injuries dropped 50 percent, from 6 to 3, while man-hours worked dropped 13 percent.

"Accidents are caused—they don't just happen" is certainly true in today's machine age. "Accidents can be prevented" also was never truer than it is today. Many outstanding safety records demonstrate the truth of these statements. Any safety effort, large or small, requires an investment of persistence, originality, work and perspiration. The return on this investment is substantial in a reduction of suffering, pain and probable disability, in keeping experienced people on the job, in less out-of-pocket injury and compensation cost, in improved morale and efficiency of employees. You, your supervision, your employees and your company benefit from such safety effort. Where can you obtain a better return on your investment?

From an address presented at the 47th National Safety Congress. Pictures by courtesy of B. F. Goodrich Footwear & Flooring Co.

Another Injury Checked



The Safety Triple Pay-Off

The protective equipment was a total wreck, but it saved the wearer from serious injury. Furthermore it was a triple pay-off for there were three items of safety equipment involved in this one accident.

The incident occurred during a welding sub-assembly operation at a plant of Bethlehem Steel Co. In manufacturing railroad hopper cars, a door frame is welded to the hopper chute, with the door frame held in place for welding by means of a jig that utilizes air pressure to hold the frame. The hose that supplies air to the jig broke but the welder started to weld. The door frame assembly slipped and struck the welder on the head. However, his welding helmet, hard cap and safety glasses protected him from serious injury.

Picture by courtesy of Bethlehem Steel Co.

Cleaning Costs

(from page 11)

and wash rooms which must be maintained. In addition, 57 mill offices must be cleaned daily.

While the number of Sanitation Department personnel at the Steel and Tube Division is not as high as that of the bearing factories, Steel Division employees are responsible for cleaning their own work areas. Added insurance of safety demands employee assistance in cleaning these areas. For example, scrap may fall to the floor in charging an electric furnace. When this happens, the floor must be cleaned immediately to eliminate the possibility of an employee slipping or falling near a furnace. Similarly, crane operators are responsible for keeping cabs and cab windows clean. Clean windows on crane cabs are as essential to safety as clean windshields on automobiles

Cleaning Equipment

This giant housekeeping program also demands a large volume of motorized and mechanical equipment—power sweepers, electric floor scrubbers, electric sewer and drain openers. Even power wheelbarrows are partially employed for cleanup purposes.

The change of seasons also brings special cleaning problems. Power lawnmowers and a farm-tractor-type mowing machine are needed for trimming lawns. The tractor-type mower is used at the Navarre Road Well, the Harrison Avenue water reclaiming pond and various Gambrinus plant areas.

Winter's snow and ice hazards necessitate the use of a power sidewalk plow and salt spreaders. Timken Company front loaders and salt spreaders are supplemented by rented contractor's equipment for control of ice and snow at the Canton and Gambrinus bearing factories and steel mills. Rented highway sweepers are used on roadways.

Keeping the plant clean also means ordering a large quantity of supplies that run the gamut from soap to sawdust, the latter being used to help clean the oily floor areas. Liquid soap is ordered in tens of thousands of gallons. Over 25,000 pounds of powdered soap

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112 S. E. Fourth St., Evansville, Ind.
MUNNINGS SAFETY SHOE SERVICE
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PETERSEN AND FELL
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3098 Madison Road, Norwood, Ohio
YEILDING BROS. CO.
2nd Ave., at 22nd St., Birmingham, Ala.

(For details, use Key # A-5 on card on page 1)

is used each year just at the Canton plants.

The highest single expense in the Timken Company's program of cleanliness is for laundry services for employees. About 4,500 employees at the Company's Canton plant need shop coats and coveralls. The Company supplies these garments without charge and, equally important to the wives of these employees, it also provides free laundry service for the clothing.

Is this high cost of housekeeping necessary? The Timken Company feels that cleanliness is an investment in efficiency and an added insurance policy for safety.

Pictures by courtesy of Timken Roller Bearing Co.

Keep Safety in Sight

(from page 9)

the job needs, and accepted safety standards.

This means that men like Jim, and Ernest, and Cliff . . . and thousands of other workers throughout the country . . . can work in comfort, health and safety. In one recent five-year period in New York State, 10,000 cases of industrial eye injuries were reported . . . and the startling fact is that—according to experts—9,000 of these accidents could have been avoided.

How many hours of agony are represented here? How many family budgets were slaughtered by hospital bills, specialists' fees, reduced earning power? Are the men in your plant receiving the eye care they deserve . . . at work? And off-the-job too?

Here is a check list of visual safety at home:

Is there an amateur carpenter sawing wood in the basement?

Does Mom wear eyeglasses that baby could break?

Are the little children playing rough-and-tumble games in fragile lenses and frames?

Can teen-age athletes play their best basketball, football or hockey . . . in eyeglasses designed for school work?

All the above cases suggest the adoption of safety glasses. Unbreakable lenses and sturdy frames are available. It costs less to supply the proper vision care now . . . than to repair the damage that might be done without it.

Connecticut Safety Conference

The 16th annual conference of The Connecticut Safety Society will take place June 13 and 14 in the Statler-Hilton hotel in Hartford, Conn., according to Frank A. Walker, society president.

This year's conference will include outstanding experts of national prominence heading the following sections: metal, chemical, construction, occupational health, commercial vehicles, public utilities and public safety. Serving as conference manager is Charles A. Wooding, of Wallingford Steel Company, Wallingford, Conn.

The Chicago plant of Sealy, national bedding manufacturer, has been named the first place winner in Group III of the annual safety contest sponsored by the National Association of Bedding Manufacturers. The awards were presented at the association's annual meeting in Miami, Fla. Since the plant's injury record for this period was zero, the plant has also earned a Safety Certificate of Achievement for a no-disabling-accident record.

Morris A. Kaplan of the Chicago plant commented that this safety record is a result of continual efforts on the part of the entire network of Sealy plants to improve manufacturing methods and working conditions. "This safety program is responsible for the refining of techniques already in use, as well as new, more advanced processes," he reports. "In addition, this progressive situation encourages employee interest in the plant and its products," he added, "which tends to make the working cycle more appealing and satisfying for everyone, to say nothing of the tremendous aid to the safety of all."

• • •

A Certificate of Merit was recently presented to Bowman's Department Store, Harrisburg, Pa., by the U. S. Fidelity & Guaranty Co. in recognition of a year of accident-free driving by the operators of the company's vehicles. O. A. Smith, Jr., Safety Director, also arranged an award dinner for the 16 drivers and their wives or friends, with individual gifts to each driver. Better than 133,000 miles of local delivery driving were covered during the 12-month period by the drivers, whose years of driving experience range from 29 down to new men who started within the year.

• • •

The Hampton, Iowa, plant of the Maytag company, which recently completed its seventh consecutive year of operation without a disabling accident, has been cited for its safety record by the National Safety council, which awarded a plaque to the Hampton plant for placing first in its category in the nation.

The plant's safety achievement—its last disabling accident was Sept. 29, 1953—ranks among the best in the nation for plants its size. Also at the council's convention, D. F. Brady, Maytag's manager of safety and plant protection, was renamed chairman of the engineering methods and procedures section of the council's automotive machine shop division.

Lighting Program

A new approach to sharply reduce lighting costs for industrial concerns, commercial establishments and institutions, has been initiated by the Westinghouse lamp division.

The basis of the new program consists of significant cost reduction recommendations based on a thorough area-by-area analysis of the existing lighting.

According to Charles E. Erb, general manager of the Westinghouse large lamp department, the cost of power to provide the level of light required, the cost of maintenance labor, and the cost of the lamps themselves make up the true cost of light in existing installations. He said that studies of average lighting installations indicate that power accounts for about 75 percent of the cost, maintenance 15 percent and lamps only 10 percent. Since power and labor rates are relatively fixed, selection of the proper light sources and relamping plan for each lighting installation offers the greatest opportunity for savings.

The new lighting cost reduction plan consists of four major segments, Mr. Erb explained. The first step is reduced cost of lamp purchases. This means the selection of the best lamp for use in existing fixtures. In other words, a suitable lamp having a lower list price, a longer average life, a higher lumen output, or a longer "in-service" life.

The second plank of the plan is reduced lamp replacement labor costs. This calls for establishing tailor-made relamping programs as well as scientific selection of the right lamp type in order to obtain longer life or higher light output.

The third segment is increased lighting levels for the same or lower cost. Mr. Erb pointed out that lamp specialists help the customer attain this goal by selecting the most suitable light source to provide not only higher lumen output but more light directly on the working surface or area.

The fourth step in the Westinghouse program is more efficient use of power. This means custom tailoring a lamp replacement program based on actual burning hours. It may also involve substitution of fewer lamps but ones having higher light output. In other cases this goal is achieved by providing more light on the actual work surface.

To take advantage of the new lighting cost reduction program, the maintenance department head as well as production or office department personnel meets with a lighting specialist at which time a complete cost reduction analysis is made. Within two weeks a complete lighting cost reduction proposal tailored to the requirements of the company is submitted by the lamp specialist.

New Electromagnetic Radiation Suit

by **RISA E. HIRSCH**
Filtron Company, Inc.
Flushing, N. Y.

New hazards require new forms of protection; and the latest product of safety research is a type of suit designed to give protection against potentially lethal electromagnetic radiation.

Electromagnetic radiation is power, even at radio station frequencies, and when it is present in the air in a high enough density (high field intensity) it is dangerous. Research on radiation hazards indicates that heat is one of the important factors, for the heat, which accumulates under constant exposure, cannot be carried away fast enough by the blood stream, to prevent malfunctioning of body metabolism. In tests, animals exposed to high-density radiation became sterile and blind.

The USAF set their maximum-safe-limit of exposure at 10 milliwatts per square centimeter of body surface.

While the new microwave radiation suit has industrial uses, the prototypes were designed for the kind of environment which exists around certain high-power radar sites. A requirement of these defense facilities is 24-hour operation, and when the radar is functioning, the air is saturated with radiation as much as 20 times denser than the 10 mw/sq cm safe limit. The problem was to clothe men so they could perform maintenance, inspection and repairs, outside shielded areas, without having to shut down the transmitting power of the entire radar station.

In 1958–59 a radar equipment manufacturer studied the power-density levels around such radar sites and made preliminary studies into the feasibility of a protective garment. Work began on the first engineering models late in 1959.

The problems faced fell into three categories:

(1) **electrical**—the suit had to shield the wearer from high-density radiation at frequencies between 300 and 1000 megacycles and also from arcing due to high-voltage gradients which would be built up on the garment's surface;

(2) **sensory**—the suit had to serve human needs of visibility, mobility and dexterity;

(3) **mechanical-environmental**—the suit had to withstand wear and abrasion, and, in an intensely cold climate, maintain resiliency, pliability, tensile and shear strengths.

Technician, using an electromagnetic radiation meter, is wearing the new one-piece suit that shields him from hazards of electromagnetic radiation.

The Shielding Material

The company's research engineers decided to work for a minimum shielding attenuation (ratio of power reduction) of 40 decibels; this, for example, would reduce an average power density of 100,000 mw/sq cm by 40 db (10^4) to 10 mw/sq cm inside the suit, and include a safety factor as well.

In theory, a shield could either absorb or reflect energy, or combine the two techniques.

But absorption meant using very thick and cumbersome materials which would also retain heat. Therefore, it was decided to search for a reflecting type of shield material. Metal is the best reflector; however, a medieval suit of armor would not do and so research turned to the cloth-and-metal combinations. (The amount of shielding produced by a material is a function of its intrinsic impedance when compared to the impedance of the impinging e-m field. The greater the difference, the greater the reflection.)

It was found that three fabrics were good reflectors in the 300–1000 megacycle frequency band, the range in which most high-power radars operate, and finally a

Engineering Specifications For Electromagnetic Radiation Suit

Shielding Effectiveness:
50 DB from 300 megacycles to 1000 megacycles.

Resistance to Arcing:
Up to 4000 volts.

Temperature:
Will not crack, peel or stiffen to -40° F.

Construction: **4-layer construction throughout.**
Outer layer—Neoprene coated black nylon.
Double interlining—specially treated nylon mesh processed to effectively reduce radiation by reflection.
Inner lining—Cotton.
Visor: Shielded facial visor permits 130° vision.

Color:
Black.

Weight:
10 pounds.

Editor's note: Readers interested in learning of a source for further information about the new electromagnetic radiation suit should address their inquiries to the editors. [1]

specially treated nylon mesh was selected, to be used in a double layer. The material has a shielding effectiveness of more than 50 decibels, 10 times greater than the attenuation initially aimed at.

Problems of Shielding Contiguity

Ideally, a shielding garment completely encloses the wearer; and the impinging electromagnetic field, in the form of current, flows around him, on the surface of the suit. But if the enclosure is broken, and current leaks through the shielding (via punctures, abrasions, inadequate seams and closures), currents will be generated within the suit and, depending on the size of the break, the wearer may be exposed to the same dangerous high-density fields he would face in plain street clothes.

Arcing: the Second Electrical Problem

Although the nylon-mesh material is a metallized fabric and therefore a good electrical conductor, it seemed possible that the man wearing the suit could suffer a severe shock when, for example, he was repairing a metal pipe while standing on a metal platform. To prevent this arcing it was decided to completely cover the suit with a third, outermost layer of a dielectric insulating material. After experiments, the selection was narrowed down to nylon coated with neoprene, a material that protects against electrical potentials higher than the 4000-volt design objective. Although the material is nonporous, the suit models were designed for low-temperature environments where this would not be a restriction.

Abrasions, Seams and Closure

The new material underwent further tests, first for its pliability at low temperatures (O°C. to —60° C.), then to see if its shielding effectiveness would remain after tight crumpling and compression, and after severe abrasion which might break shielding continuity. After an hour of abrading with fine sandpaper, the cloth surface of the second (inner) layer ripped yet the shielding efficiency still remained

at more than 50 decibels. Crumpling, as a matter of fact, improved the shielding by compressing the fabric's fibers.

Experiments with stitching showed that a double-needle seam successfully survived mechanical wear tests and shielded as effectively as a single, uncut layer of cloth.

It was more difficult to find an adequate closure. Researchers tried a pair of nylon tapes covered with many tiny hooks and eyes, but when the tapes were metallized for shielding purposes, they lost their cohesive properties. Then they tried several slide fasteners (zipper-type), but experiments showed that the teeth of the fastener could not be crimped onto a beading made of nylon. Finally, the engineers designed their own type of closure which fully meets the requirements of flexibility and shielding.

Design of the Suit

Originally it had been planned to design a two-part suit, but the idea was discarded because of the complete cloth-to-cloth contact necessary for uninterrupted current flow around the suit. The only practical design was a one-piece outfit that included mittens as part of the sleeves, stockings as part of the pants legs, and a hood extending up from the collar.

The suit opens in the rear because, first, a rear closure can be of minimum length and, second, it's easier to duck forward into a helmet than to duck backwards.

The rear closure proves to be an additional safety measure. A hazard garment of any type—for firefighting, sea diving, or pressure—should be inspected as it is put on to see that it is worn properly. The microwave radiation suit protects against equally lethal hazards and must be put on with the same care. An assistant to the man wearing the suit provides this care.

Visor Design

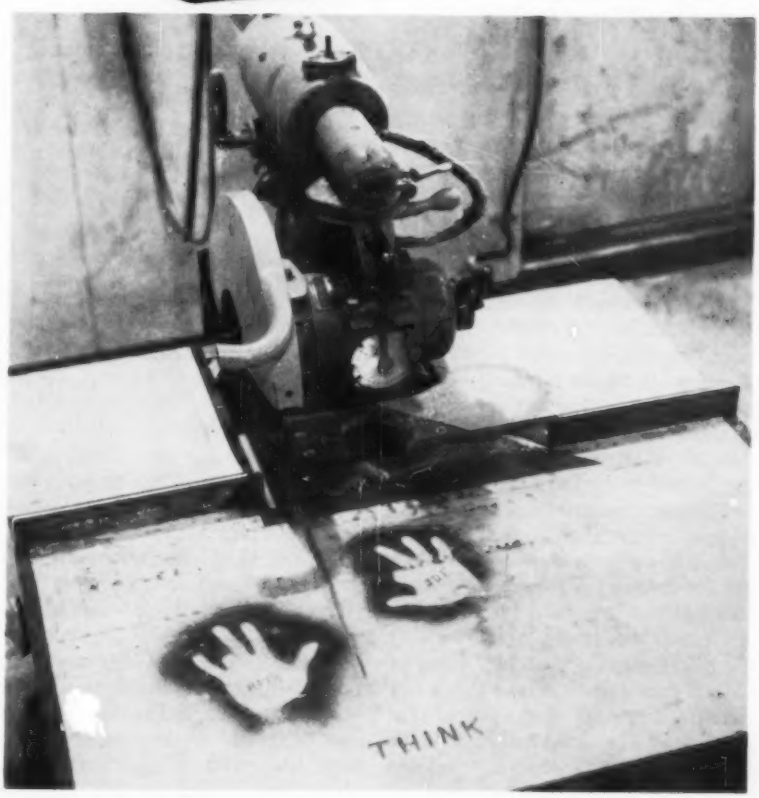
Visibility is provided through the hood's semi-circular visor made of wire mesh that offers a 130°-field of vision. After experiments with protective visors based on wave-guide-below-cutoff, it was found that these designs cut the field of vision by a third and also had an unsettling psychological effect on nontechnical personnel who could not "see" the protection for their eyes.

The suit weighs ten pounds. It has been proportioned to provide maximum mobility, and it is possible to run, squat, bend and twist without restrictions. A technician wore the suit in a refrigerated chamber for one hour. Under the suit he wore a sweat shirt and sweat pants, over it, a parka and arctic boots. At strenuous activities he perspired, yet felt that the one hour test could have been extended indefinitely.

Pictures by courtesy of Filtron Company, Inc.

Safety Maintenance SALUTES

A SAFETY IDEA



Dramatize Hazards On the Spot

An eye-catching, thought-provoking and effective way to dramatize the inherent hazards of bench saws and other dangerous machines is to paint on the saw table or other suitable place outlines of the hands from which one or more fingers have been amputated. The idea for this Lost-Finger Warning was developed by two shop employees at Coulee Dam National Recreation Area. They applied the idea first to a radial saw table in their shop, as shown in the picture.

Both men had suffered amputations as the result of accidents during past employment and wanted to warn their fellow workers of the ever-present danger, according to "Park Practice Grist." They spray-painted around their hands and added their nicknames to personalize the pictures.

Picture by courtesy of National Park Service, U. S. Department of the Interior.

Edited by HENRY M. GROSMAN
Counselor at Law, Newark, N. J.

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Master Superior Court, New Jersey
American Bar Ass'n, New Jersey Bar Ass'n,
Chairman, Committee on Workmen's
Compensation, New Jersey Bar Association
National Federation Insurance Counsel
Past Commander, American Legion, Post 10,
. . . . . Newark, N. J.

COURSE OF EMPLOYMENT—Death of State Liquor Enforcement Officer—Scope of Authority

The widow of a liquor enforcement officer who met his death in a plane crash was not entitled to compensation because the accident did not occur within the course of his employment. The deceased was to work within a specially designated area of Colorado, the San Luis Valley and the San Juan Basin. A person living in Grand Junction, Colorado, owned and wished to sell a bar located within the decedent's designated area. A sale had been negotiated to two brothers but was contingent upon their acquiring a liquor license for the premises. Two other men wished to purchase the bar and when it became apparent that the proposed buyers were not acceptable licensees, they asked the decedent to accompany them to Grand Junction to assure the seller that the brothers could not obtain a license. The decedent took with him the department file, notified the seller that the other proposed buyers could not obtain a license and took no further part in the negotiations. After a sale was agreed upon, the decedent and two buyers entered the plane and returned to Del Norte where the fatal crash occurred. The commission entered an award; the award was vacated by the trial court and that decision was affirmed on appeal. It was ruled that the decedent was not acting within the general scope of his authority in going to and returning from Grand Junction. Supplying of information may have been within the decedent's implied authority, but this could not be extended to embrace a trip to a distant city to help negotiate a sale. The errand was unnecessary and unauthorized. Affirmed.

Fouquet vs. State Compensation Ins. Fund; Colorado Supreme Court. No. 19336. October 10th, 1960.

ALLEGED HORSEPLAY—Arising Out of Employment

Claimant was not entitled to compensation for an ankle injury due to the aggression of a fellow employee because he did not prove that the attack arose out of his employment. The only testimony was by the claimant to the effect that he was loading a truck when an employee, who worked in another building 125 feet away, came up behind him, put his arm around him and swung him around causing him to fall to the ground and fracture his ankle. In addition, he stated that he had not seen this employee that day and had last seen him about three weeks prior to the time of the injury. On cross-examination, he testified that he worked for his employer for 2½ years that he saw the employee occasionally, that they did not live in the same neighborhood and that the two had never wrestled on any prior occasion. The arbitrator awarded compensation, the commission reversed the award, but it was reinstated by the lower court. On appeal, compensation was denied because the claimant did not show that the nature of the employment was a contributing proximate cause of the injury. The claimant's mere allegation that the injury was the result of horseplay was not supported by the evidence, for it appeared that the employees never engaged in horseplay and that they were not brought in close association by their employment. The injury did not arise out of the employment because no reason for the attack was shown. Reversed.

American Brake Shoe Co. vs. Industrial Commission; Illinois Supreme Court. No. 35718. September 29th, 1960.

COURSE OF EMPLOYMENT—Horseplay

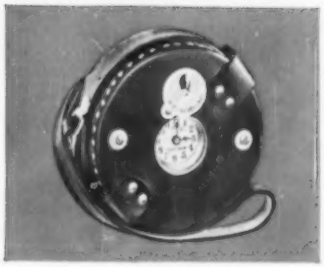
The court denied compensation for an injury occurring at work through horseplay. The claimant was injured when he was hit with a hot asphalt scraper by a fellow employee. The court accepted as a fact that his action, causing the other employee to hit him, was horseplay of a nature common in the plant where the claimant worked. However, in certain dangerous phases of the work, such as the one in question, there was a mutual understanding among employees that there would be no horseplay. The court ruled that the injury was unconnected with any of the claimant's duties, and that the injury was not sustained in the course of his employment.

McKenzie vs. Brixite Manufacturing Co.; New Jersey Superior Court, Appellate Division, No. A-120-59. May 24, 1960.

JURISDICTION—Determination of Place of Contract of Employment

The lower court erred in holding that the contract of employment was made in Florida. The employee, injured in Alabama, filed his claim for compensation with the Florida Commission alleging that it was allowable under the provision of the Florida Workmen's Compensation Act relating to injuries outside of the state when the contract of employment was made in Florida. The issue of whether the Commission had jurisdiction over the claim turned upon where the contract of employment would be held to have been made. The claimant, a former employee of the defendant employer, had been contacted by phone in Miami and was offered a specific job if he would return to Atlanta, Georgia. He gave up his employment and proceeded to Atlanta where he immediately went to work. The court agreed with the lower rulings that there had been a unilateral offer of a contract of employment but stated that it adhered to its previous decisions that, in such a case, the place of contract was the place of performance of the last act necessary to complete the contract in accordance with the offer made by the offeror. It was stated that, although the main offer for a unilateral contract includes an implied promise that if part of the requested performance is given, the offeror will not revoke his offer, it could not be held that partial performance essential to accepting the offer constitutes an acceptance of the contract so as to support the conclusion that the place where the performance is commenced is the place of contract. Inasmuch as it had been found that the employer had imposed the condition that the offer could be accepted by the claimant's presenting himself in Atlanta, the court ruled that this must be held to have been the last act necessary to complete the agreement. Since this act could only be performed in Georgia, the place of contract was held to be Georgia and not Florida. Reversed.

Ray—Hof Agencies, Inc. vs. Petersen; Florida Supreme Court. No. 30, 460, September 21, 1960.



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MEDICAL EXAMINATION REFUSED—Termination of Award—Refusal to Submit to Myelogram

The claimant was entitled to continued compensation for disability due to an alleged ruptured disc since her refusal to submit to a medical examination was not unreasonable. It was not denied that the claimant suffered a back injury by reason of a fall while in the course of her employment, but the employer contended that she was not entitled to compensation by reason of her refusal to submit to a myelogram to determine whether or not she had a ruptured disc. An orthopedic surgeon testified that the claimant needed the myelogram for proper diagnosis, but he was reasonably sure without it that she had a ruptured disc. His opinion was that the test is 80% accu-

(Continued on page 28)

Fig. 8 Bright light of stroboscope cuts through oil bath to show rotating anodes in x-ray tubes at Matchlett Laboratories.

Industry's Watchdog

(from page 14)

pretty quickly through its value as a maintenance watchdog.

Electronic and Electromechanical Uses: The high flashing rate of the modern stroboscope puts it within reach of frequencies formerly beyond stroboscopic techniques. For instance, a loudspeaker manufacturer uses a new type of stroboscope to study dispersion and frequency response of speaker radiators. By an ingenious technique using finely shredded rayon flock glued to the radiator surface, this manufacturer can examine the radiator for break-up and other irregularities at frequencies up to 20,000 cycles per second.

Another interesting application in electronics is shown in Figure 8. In certain x-ray tubes, the anode spins at 9000 to 10,000 rpm, a technique devised to focus the x-rays without anode burnout from excessive emission. In the application pictured, a very bright-light stroboscope is required; it must penetrate a double window in the tank, an oil bath used for cooling, and the tube envelope in order to present the rotating anode for inspection.

Checking Color Registration in Printing: Proper color registration —so often a headache for printers— is easy to achieve with a stroboscope on hand at the press. While the press is operating at high speed, the pressman can watch color registration through the magic of the stroboscope. One manufacturer of gift-wrapping paper estimates that the use of a stroboscope to check registration effectively doubles the production speed of his four-color rotogravure press. (See Figure 9.)

High-Speed Photography: The bright flash of the stroboscope can have a duration of less than a millionth of a second. In such a short interval, even the fastest motion is virtually stopped. For instance, a speeding rifle bullet doesn't move even a tenth of an inch in a millionth of a second. The use of stroboscopic light to expose film opens up the fascinating field of high-speed photography. Using both single and multiple flashes of stroboscopes, photographers have captured actions never before seen in detail. The equipment required is not elaborate—camera, proper film, stroboscope, and some means of synchronizing the flash with the motion—and stroboscopic photography is widely used in industrial plants for design and maintenance.

Other Uses: It is clearly beyond the capacity of this article to describe all the uses of the stroboscope. Among the more unusual applications are experiments conducted in the medical, psychological, and physiological fields. At MIT, Dr. J. Y. Lettvin is trying to find out if a person sees anything while his eyes are moving. A stroboscope is triggered by electrodes fastened to the subject's eyes, so that the light flashes only when his eyes move. Thus, with the subject in a dark room, there is illumination only during the times his eyes are moving. Neurologists, encephalogists, and psychologists have used stroboscopes in equally dramatic applications.

Fig. 9 A big press at Forbes Lithograph prints chewing-gum wrappers as stroboscope keeps an eye on color registration.

Some say that the stroboscope, over the past 20 years, has exerted more influence on the mechanical and electrical industries than has any other instrument. Just as the telescope and microscope gave new sight to the astronomer and biologist, the stroboscope has given new eyes to industry, to the point where it is fast becoming an indispensable instrument.

Pictures by courtesy of General Radio Co.

What's the Law?

(from page 27)

rate. He also stated that the claimant and her husband refused to have the test performed or anything done to the claimant's spine for fear of unfavorable results. The evidence also indicated that a myelogram causes discomfort or severe pain depending on the patient, and that the claimant was a highly nervous person unwilling to undergo the test or an operation of any kind on her spine. Another doctor doubted the existence of a ruptured disc, stated that the test was not serious nor particularly painful and that the test is 90% accurate. A third doctor diagnosed the condition as a ruptured disc and gave his opinion that a myelogram was not a "must." The above evidence supported the trial judge's decision that the refusal was not unreasonable. In addition, the test was not necessary because, if the result were positive, the claimant could reasonably refuse an operation for a ruptured disc, which intention she had already manifested, and, if the test were negative, the result would be inconclusive; that is it would indicate that the test was not accurate or that something else was causing the trouble. Affirmed.

Tatum d/b/ as Tatum Shoe Company vs. Palmer; Tennessee Supreme Court. October 2, 1960.

THE FIRE FRONT

"Sticky" Water Extinguishes Better

Water that sticks to a burning surface and snuffs out fire ten times faster than ordinary water is being developed by Syracuse University scientists.

Dr. C. S. Grove, director of engineering research at the university's research institute, told the 64th annual meeting of the National Fire Protection Association recently that improving water's fire-fighting qualities may be the best way of curbing fire's tremendous destruction of life and property.

Dr. Grove said the institute's scientists, in 14 years of studying various compounds, have come to believe that some of the best qualities of fire-fighting foams can be transferred to water. The foams are used in specialized fire fighting, such as battling electrical, chemical and aircraft crash blazes.

Water, always the cheapest and most abundant and often the only fire fighter available, has some drawbacks, Dr. Grove pointed out. So for the past three years the scientists have been concentrating on chemicals which improve water, mainly thickeners.

Thickened water clings to a burning surface longer than ordinary water. Whereas ordinary water evaporates quickly and runs off a burning surface, thickened water has better blanketing properties. And yet this thickened water has a consistency very similar to that of milk.

Of the viscosity additives (thickeners) for which testing has been completed, the most effective is a new synthetic water-soluble compound. One of its principle advantages, is that it goes into solution with water faster than any of the other compounds tested as thickeners.

The scientists believe that the product can be used in conventional fire-fighting equipment. All that would be necessary, they believe, is a slight modification of the pumps which fire trucks use to boost the pressure of water flowing from fire hydrants. The change would permit small amounts of the thickener, which is a powder, to be injected directly into the flow.

Other additives which have been tested at Syracuse, although to a lesser extent, are opacifiers and detergents.

Opacifiers make water cloudy, which enables it to reflect the radiant energy of flames away from the burning structure, Dr. Grove said. Detergents help spread opacifier particles evenly through the water.

Dr. Grove said most major manufacturers of these additives have submitted samples for the institute's evaluation.

"Essentially, our basic approach is to screen these additives in our laboratory and then test the more promising on small and large scale fires," he said.

Both types of fires are built with kerosene-soaked pine in an 1,800-cubic-foot galvanized sheet metal building. The small-scale fires are allowed to burn four minutes, to reach maximum intensity, and then are sprayed with additive-treated water from a single hose.

Larger Fire Tests

Solutions which prove most effective on the small-scale fires are then subjected to further tests on large-scale fires. The large-scale fires are built with more wood and allowed to burn for varying lengths of time before four streams of treated water extinguish them.

The most successful opacifier tested to date, Dr. Grove said, is aluminum powder.

Aluminum powder, the thickener, a detergent and water is regarded as one of the most promising formulations, and further investigation may lead to great advances in fire extinguishment.

October Losses Rise

Estimated fire losses in the United States during October amounted to $92,730,000, the National Board of Fire Underwriters has reported. This $92,730,000 loss represents an increase of 30.3 percent over losses of $71,160,000 reported for October, 1959, and an increase of 13.3 percent over losses of $81,845,000 for last September.

Losses for the first ten months of 1960 now total $921,581,000, an increase of 5.7 percent over the first ten months of 1959, when they amounted to $872,047,000. These estimated losses include an allowance for uninsured and unreported losses.

Hazardous Truckloads

People's lives are endangered every day by tons of highly hazardous but unmarked chemicals moving over the nation's highways, a National Fire Protection Association conference was told recently.

This dangerous situation exists because of deficient Interstate Commerce Commission regulations, according to Major Carroll E. Shaw, deputy state fire marshal of Connecticut.

Present ICC requirements for marking hazardous truck cargoes, declared Shaw, "are grossly inade-

(Continued on page 34)

HEAT RATINGS OF BUILDING MATERIALS

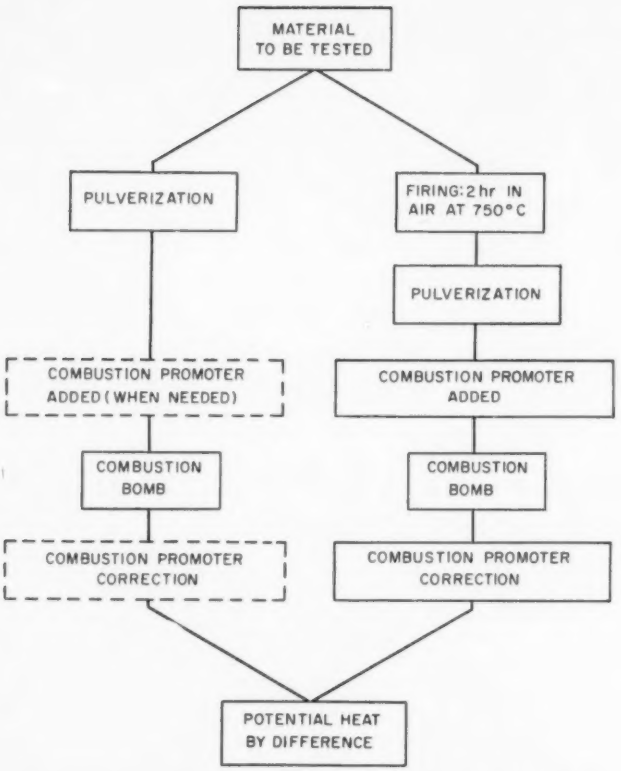

Fig. 1 Shown above is a schematic flow diagram displaying the methods which the National Bureau of Standards developed for measurement of potential heat of materials in building fires.

The extent to which construction materials burn and add heat during fires is considered important by building code officials. A differential bomb calorimetric procedure for measuring quantitatively the actual potential heat (in BTU per unit weight, volume or area) of materials in building fires has been developed by the National Bureau of Standards, and applied to a wide variety of materials. The method, a modification of a recent standard of the French government,[1] resulted from a study conducted by J. J. Loftus, D. Gross, and A. F. Robertson of the Bureau's Fire Research Section. The findings show that the method provides a useful tool for quantitative evaluation of the potential heat contribution of building elements when subjected to fire.

At present, building codes contain various requirements with respect to the "noncombustible" properties of materials to be used in different portions or types of buildings.[2] Although the extent to which building materials burn and add heat to fires is thus considered important by building code officials, the commonly used noncombustibility test methods usually measure some combination of the flammable, smoldering, and heat release prop-

(Continued on page 32)

Fig. 2 Specimen container and firebrick support being placed in a muffle furnace for firing, a step in measuring the heat of materials in building fires.

Table I

Potential Heat of Selected Building Materials Together with Flame Spread Index

Material	Thickness in.	Density lb/ft³	Potential Heat Weight Basis BTU/lb	Potential Heat Volume Basis BTU/ft³	Potential Heat Unit Area Basis[a] BTU/ft²	Flame Spread Index
1. *Woods*						
a. Douglas fir, untreated	¾	38.0	8400	319×10^3		69
b. Douglas fir (retardant treatment "A")	¾	37.2	8290	308		5
c. Douglas fir (retardant treatment "B")	¾	47.2	7860	371		3
d. Douglas fir (retardant treatment "C")	¾	38.8	7050	274		1
e. Maple, soft, untreated	1	39.5	7940	314		82
f. Hardboard, untreated	¼	59.8	8530	510		150
2. *Plastics*						
a. Polystyrene, wall tile	0.075	65.4	17420	1140		335
b. Rigid, polyvinyl chloride, retardant treated	0.147	86.0	9290	799		10
c. Phenolic laminate	0.063	76.4	7740	592		107
d. Polycarbonate resin	¼	78.7	13330	1050		56
3. *Insulation*						
a. Glass fiber, semi-rigid, no vapor barrier	1	3.0	3040	9.1		—
b. Rock wool batting, paper enclosure	3	2.4	1050	2.5		—
c. Roof insulation board	1	10.4	3380	35.1		61
d. Cork (reconstituted cork sheet)	¼	14.8	11110	164		174
e. Cellulose mineral board	2	47.8	2250	108		1.3
4. *Concrete*						
a. Cinder aggregate	—	93.0	3080	286		0.0
b. Slag aggregate	—	110.1	80	8.9		—
c. Shale aggregate	—	80.5	10	0.5		—
d. Calcareous gravel aggregate	—	133.1	–250	–33.1		—
e. Siliceous gravel aggregate	—	166.8	–40	–6.7		—
5. *Cement Board*						
a. Asbestos cement board	3/16	117.0	80	9.2		0.0
b. Asbestos cement board + 20 mil paint	3/16	159.2	390	62.4		0.7
6. *Gypsum*						
a. $Ca\ SO_4 . 2H_2O$, hydrated neat gypsum	0.41	137.9	–290	–31.3		0.0
b. Perlite aggregate plaster, 21% aggregate	1	53.2	70	4.0		0.0
c. Sand aggregate plaster, 68% aggregate	1	101.8	–50	–5.4		0.0
d. Vermiculite aggregate plaster, 15% aggr.	1	51.2	–90	–4.6		0.0
e. Gypsum board "A"	⅜	50.5	760	38.4		14.3
f. Gypsum board "A" with paper removed	⅜	46.6	–270	–12.5		0.0
g. Gypsum board "A" + alkyd gloss paint	⅜	46.7	880	41.2		8.0
h. Gypsum board "B"	½	51.2	650	33.0		7.9
7. *Lath*						
a. Gypsum A	⅜	55.3	310	17.0		—
b. Metal diamond mesh	.025	405	1230	—	1370	0.0
c. Metal diamond mesh, paint removed	.019	401	660	—	420	0.0
8. *Metals*						
a. Structural steel—unpainted	.060	489	230	—	190	—
b. Magnesium	.128	122	10800	—	5400	—
c. Aluminum	.004	165	30	—	0.8	—
d. Brass	.004	534	100	—	8.9	—
e. Copper	.024	556	60	—	32	—
f. Lead	.036	710	280	—	278	—
g. Zinc	—	415	760	—	2390	—
9. *Miscellaneous*						
a. Paint "E" (dried paint film)	.05	—	3640	—		30
b. Asphalt shingles (fire retardant)	¼	70.7	8320	588		123
c. Building paper (asphalt impregnated)	.042	42.8	13620	583		385
d. Building paper (rosin sized)	.018	23.6	7650	181		192
e. Linoleum tile	⅛	86.0	7760	667		106
f. Brick, red-face	2–1¼	139.1	20	2.2		0.0
g. Charcoal, coconut	—	—	13870	—		—

[a] Based upon total exposed surface area.

Note: All weights and percentages refer to original air-dry weight.

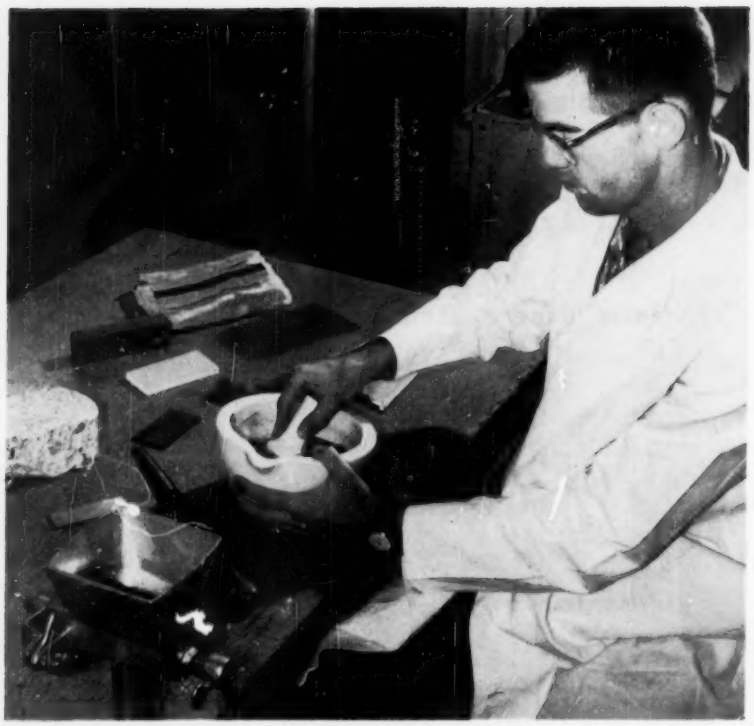

Fig. 3 Sample of material being pulverized with a mortar and pestle. Shown also are handmill and a file, used to grind certain other building materials into powder. On the table appear concretes, cinder block, fibrous insulation, and metal and gypsum lath, included in materials studied for potential heat.

Heat Ratings

(from page 30)

erties of a material. However, the results are usually of a qualitative nature with emphasis varying, depending on the material and test method used. The method studied at the Bureau now appears to provide a procedure for measuring the heat release of materials under standardized conditions and independent of flammability and smoldering properties.

Recently, various methods for quantitative measurement of heat release have been considered. The Factory Mutual Association has described a calorimetric furnace to measure heat release rates for four-foot-square test samples of construction.[3] And the French government test method, which was the basis for the method developed by the Bureau, makes use of a differential oxygen bomb calorimetric procedure.

In the Bureau's method, calorimetric measurements are performed on the test material both before and after exposure to a "standardized fire" (two hours in an oxidizing atmosphere at 750° C). The difference may be considered the potential heat.

This procedure has been applied to various materials, including metals, and the results appear to be consistent with behavior of these materials in actual fires.

The method has been found to be particularly well suited for measurements on materials of low combustibility. For such measurements, a combustion promoter whose heat of combustion is accurately known can be added, so that complete burning of small quantities of a combustible in an otherwise inert material is assured. In fact, it has been found, by comparision of computed and measured potential heat of mixtures of hydrated plaster and charcoal, that the method is capable of measuring combustible content in amounts as low as 1 or 2 percent.

The method also is designed to yield realistic potential heat values for materials, including some metals, which are completely burned in an oxygen bomb calorimeter, but which contribute only small quantities of heat in actual building fires.

Test Method

The steps involved in the test method are as follows: (See also Figure 1.)

Two samples are removed from the material to be tested. One of

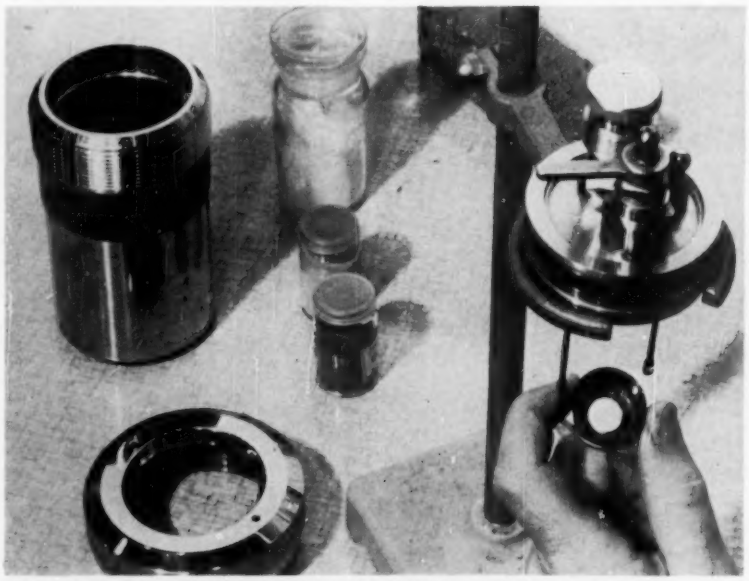

Fig. 4 Fuel pan containing sample pellet (held in hand above) is shown ready to be placed in oxygen bomb (shown here disassembled). Pellet has been produced from a pulverized building material. After pellet has been put in place, the bomb will be assembled and placed in a calorimeter. In the center and center background appear jars containing other pulverized materials, and a larger jar containing (white) benzoic acid, used as a combustion promoter with materials of a low combustible content.

these is ground, pelletized, and then burned in a pressurized oxygen bomb calorimeter, yielding a measure of the gross heat of combustion of the material. With materials of low combustible content, an equal weight of calorimetric standard benzoic acid, the combustion promoter, is added prior to pelletizing the specimen for test. This ensures complete burning of the combustible fraction.

A second specimen, of about ½ by ¾ by 3 inches in size, is fired by exposure to the oxidizing atmosphere of a muffle furnace for two hours at a temperature of 750° C. The weight loss of the specimen is noted, and the residue remaining is ground or pulverized. A portion of this resulting powder corresponding to a known weight of the original material is mixed with the benzoic acid promoter, pelletized, and burned in the calorimeter.

Corrections are made for the heat contributed by the benzoic acid, and the difference in heating values of the two specimens is reported as the potential heat.

The selection of the standard fire exposure conditions to which the specimen is subjected in the muffle furnace ensures the complete combustion of the fuel fraction in cinder concrete and the oxidation of carbon resulting from the pyrolysis of wood. The temperature of 750° C has long been used in combustibility test methods both in the United States and abroad, and is high enough to cause many reactions which occur in building fires. In the case of metals, for example, magnesium ignites under the firing conditions while aluminum melts without becoming inflamed. These are results typical of fire experience.

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Results with Various Materials

Materials studied (Table 1) included woods, plastics, metals, insulation materials of various types, concretes, and plasters. Their potential heat values ranged from –290 BTU/lb for gypsum plaster to over 17,000 BTU/lb for polystyrene. Negative potential heat values are indicative of heat absorbing reactions occurring during the muffle furnace exposure. The negative value for gypsum results from at least partial chemical decomposition of the hydrated gypsum.

Materials such as brick, asbestos-cement board, and some concretes showed very low potential heat, whereas cork, polystyrene, and asphalt-impregnated building paper produced very high values. Expanded metal lath, and gypsum lath and wall board exhibited potential heat values which were low but not zero. Some of the "non-combustible" insulation materials also showed low (but not negligible) potential heat. The potential heat for glass fiber material resulted from the phenolic binder.

The potential heat values for expanded slag, shale, and siliceous aggregates were nearly zero. The potential heat for the concrete incorporating a calcareous aggregate was slightly negative. This latter result would be expected because of the heat absorption required for calcination of the aggregate. How-

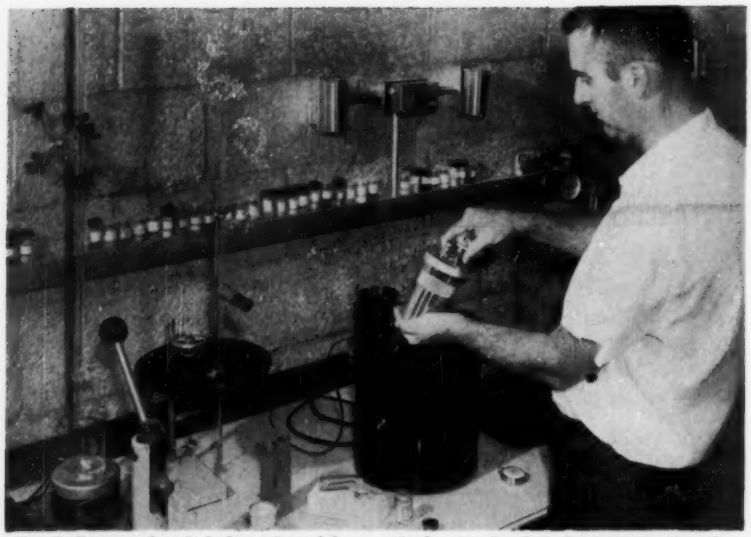

Fig. 5 Oxygen bomb being placed in a calorimeter bucket, in preparation for firing a sample pellet of building material. Also shown on the laboratory bench are the calorimeter cover with thermometer and stirrer; the pellet press, benzoic acid combustion promoter in bottle; a cinder block specimen before pelletizing; and a specimen container in a refractory support (for insertion in the muffle furnace shown in Fig. 2). The bottles on the higher shelf contain pulverized samples of some of the building materials studied.

ever, the cinder aggregate concrete specimens exhibited significantly positive values of potential heat.

The plaster specimens showed low or negative potential heat values which were not as high as those of gypsum wall board. The latter were affected by combustion of the paper facing and of the finish.

Of the metals tested only steel, copper, and brass did not melt at the muffle temperature. However, with the single exception of magnesium, the oxidation of the metals was not severe, and potential heat should be considered low but not zero.

During the studies performed, only one material, graphite, failed to burn in the bomb, but was consumed in the firing process. Charcoal, on the other hand, which comprises carbon with chemically bonded hydrogen, readily burned in the bomb.

With woods and plastics, the quantity of residue (ash) remaining after firing was so small that it was not necessary to make a calorimetric determination on the residue, and the potential heat was considered equal to the gross heat of combustion.

1 "Sécurité Contre L'Incendrie" Classification des matériaux et éléments de construction. Journal Officiel de la Republique Francaise. No. 59-23-S (January 1959).

2 Some of the current and proposed test methods are included in the following:

a. National Board of Fire Underwriters—"National Building Code" 1955 Edition, 17–18.

b. National Fire Protection Association Committee on Building Construction—"Standard Types of Building Construction-Definition of Noncombustibility," NFPA No. 220–1956 (National Fire Codes, Vol. III, 1960–61).

c. American Society for Testing Materials Committee E-5. "Tentative Method of Test for Determining Noncombustibility of Elementary Materials" ASTM E-136-59T, ASTM Standards 1959.

d. British Standards Institution "Fire Tests on Building Materials and Structures-Combustibility Test of Materials" British Standard 476:53, 6–7.

e. N. P. Setchkin and S. H. Ingberg. "Test Criterion for an Incombustible Material" Proc. ASTM V 45, 866-77 (1945).

3 N. J. Thompson and E. W. Cousins. "The FM Construction Materials Calorimeter," Quarterly of the National Fire Protection Association, V. 52, No. 3, Jan. 1959, 186–192.

Retailers Form Safety Group

Employees of large mercantile establishments throughout New Jersey have formed the Safety Retailers Organization of the N. J. Safety Council. The group will plan safety programs for supermarkets, shopping centers, and other retail establishments in the state.

Arthur H. Howe, superintendent of R. J. Goerke Co., and W. D. Sullivan, claims manager of Food Fair Stores, Inc., were named to the group's program development committee.

The organization's chairman is George Matwes, safety director of L. Bamberger & Co. stores in New Jersey.

Hazardous Truckloads

(from page 29)

quate for the protection of both the public and the men of the fire services."

He spoke at a conference session of the National Fire Protection Association, international fire-safety organization which opened a three-day meeting in Columbus, Ohio, with several hundred fire experts from the U. S., Canada and other countries in attendance.

Shaw called for immediate action to correct the situation.

"Much too little thought is given to the transportation of highly dangerous chemicals moving daily through our states," he said. Many of them are newly formulated materials which need an expert chemist to rate their hazards. Yet present ICC regulations require in many cases only that the truck carry a sign marked "Dangerous" or "Flammable" followed by the name of the product—a name which often tells nothing to the layman, Shaw stated.

Biggest weakness in ICC requirements, he explained, is that "any cargo less than 2,500 pounds doesn't have to be marked at all. And there are so many things under 2,500 pounds that can do a lot of damage —a few drums of rubber cement, or acetone, or paint thinner in a mixed load of other merchandise, for example."

"The fire service is constantly being called out to fight fires in trucks which from their appearance give no indication that they may be carrying dangerous commodities. They find sometimes to their dismay that they are fighting some pretty hot stuff."

Shaw cited instances where both spectators and firefighters have been killed or injured in such situations.

The public and the fire services urgently need the protection of "a simple system of readily recognizable and easily understood markings on trucks. They would give at a glance a general idea of the inherent hazard of any material, as well as the possible severity of that hazard as it relates to fire prevention, fire exposure and fire control," Shaw said.

Such a system is "entirely feasible, and something must be done about it right now," he declared.

Instructor (right) guides trainee in attack on oil pit fire. He coaches him in handling of dry chemical fire equipment.

Director of Ansul Chemical Company's Fire School conducts "skull" session before taking group out to face real fires.

Do-It-Yourself Fire Fighting School

Knowing how is rarely more vital than in the application of fire extinguishing equipment. It is not enough for fire brigades to know the location of fire equipment in the plant, to meet occasionally for a review of fire problems, and to know what their duty stations are in fire emergencies. These elements of fire knowledge are important, but they are not a substitute for actual practice in extinguishing fires.

To give industrial fire personnel expert guidance in fire control and realistic experience in fighting various types of fires, the Ansul Chemical Co. has for several years been holding three-day fire fighting schools, originated at the request of the extinguisher manufacturer's customers.

Although the training involves some classroom sessions, the emphasis is on "doing" out on the training field. Beginning with small gasoline spill fires, the trainees work up through larger spill fires and pan fires, flammable-liquid pressurized fires, interior fires, and even a simulated airplane crash fire.

In order to provide the maximum individualized instruction to each of the trainees, classes are limited to 25 persons. Most of the schools

(Continued on page 59)

John T. Jenkinson, safety and claims manager for Mobil Oil Company in Chicago is seen in an attack on an oil pit fire.

With dry chemical from last fire extinguishment in air, trainee moves across test field to site of different type fire.

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Resuscitation Folder

An illustrated folder detailing steps of the mouth-to-mouth rescue breathing technique of artificial respiration has been prepared for national distribution by Aetna Casualty and Surety Company.

The new oral resuscitation method has proved to be the best and most practical way to revive victims of drowning, asphyxiation and electrical shock, and is recommended by leading medical and safety organizations.

Effectiveness of the technique was demonstrated recently when a 10-year-old boy who was unconscious for several minutes after a hanging accident was revived by men following instructions on an Aetna Casualty safety poster.

The folders, titled "The Breath of Life," are being distributed nationally through the company's representatives. A limited number may be obtained by writing to the Information & Education Department, Aetna Casualty and Surety Company, Hartford 15, Conn.

Two Bulletins on Electric Shock & Mechanical Handling

Two new Bulletins, issued by the Labor Department's Bureau of Labor Standards, provide information useful in preventing industrial injuries.

Written in non-technical style, Bulletin 216 provides information on how electrical shock occurs, the severity of shock under different conditions, and how shock can be prevented. The theory of grounding is discussed, and practical methods of providing an effective ground are given. The bulletin lists typical shock hazards which might be encountered in industry and suggests methods of control.

Bulletin 219 classifies mechanical materials handling equipment into three classes: conveyors; cranes, derricks, and hoists; and powered industrial trucks. It describes and illustrates the principal types in each class, discusses safety features in the design of each class of equipment, and suggests safe operating precautions. The bulletin also gives safe working loads for ropes, cables, and chains used for handling materials.

Copies are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. at 15 cents for each Bulletin. Single copies are available, without charge, from the Bureau of Labor Standards while the supply lasts.

Conductive Floorings

Conductive Flooring for Hospital Operating Rooms, by Thomas H. Boone, Francis L. Hermach, Edgar H. MacArthur, and Rita C. McAuliff, National Bureau of Standards Monograph 11, issued March 21, 1960, 16 pages, 20 cents, previously published in National Bureau of Standards Journal of Research, Volume 63C, No. 2. (Order from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

Sparks which can result from the accumulation of static electricity

constitute a very real hazard in locations where explosive vapors are present. The most effective means of reducing this hazard consists in keeping the electrical resistance between all objects in the area so low that dangerous voltages are never attained. This monograph studies the characteristics and performance of conductive flooring materials as a primary factor in solving this problem.

Investigation indicated that the physical, chemical, and serviceability characteristics of available types of conductive flooring are comparable with those of non-conductive flooring. It also showed that the instruments used to measure the floor greatly affected its resistance but that the method specified by the National Protective Fire Association reasonably simulated actual conditions under which a floor functions in reducing electrostatic hazards.

Although this investigation was carried out primarily to evaluate conductive floors for hospital operating rooms, many of the results obtained should apply equally well in other locations where electrostatic hazards exist.

The monograph may be ordered from: Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Foreign remittances must be in U. S. exchange and should include an additional one-fourth of the publication price to cover mailing costs.

Heart Disease

An authoritative book with a light touch has been written about the nation's No. 1 killer—heart disease—for people who know nothing about medicine but are concerned about their own health. Dr. C. A. D'Alonzo, assistant director of the DuPont Company's Medical Division, has drawn on the company's preventive medical program for employees and the research of the medical profession to throw some understanding light on a worrisome problem.

His light touch removes many of the fantasies that can actually worry some people sick and simultaneously points up the things about which they ought to worry

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and see their doctor. For while it is well known among doctors, it is probably not among the public that heart disease is not necessarily fatal and many things can be done about it.

Dr. D'Alonzo points out that among DuPont employees the death rate from heart disease is significantly lower than the national rate and that much of the difference must be attributed to the 40-year-old program of preventive medicine which covers all employees.

The book is about heart diseases —what they are, how they work, what they do to people, and the most likely things people can do to head them off. Entitled "Heart Disease, Blood Pressure and Strokes," it is published by Gulf Publishing Company of Houston, Tex. It is available in book stores at $3.50.

To Dr. D'Alonzo, the heart is "an amazing gadget" and "some remarkable things can go wrong with it." In such language does he write of what the heart is, how it works, and what things do go wrong—as well as assorted aches, pains, flutters and what not over which people worry needlessly. Along with it are some remarkable simple pictures and charts running through its 159 pages, sharply illustrating what happens.

One of the things worrying many people is blood pressure. The author points out simply that "all of us have blood pressure" and goes on from there to relate what it is, what signals indicate danger, and winds up with "the patient's best friend"—low blood pressure.

Dr. D'Alonzo has included a brief questionnaire for readers, their own answers indicating whether or not they should see a doctor. The questions are loaded but they serve the purpose of letting a person know whether his symptoms mean potential trouble or needless worry. Here are a few of them:

Do you yawn frequently? Do you have to sleep on a higher pillow? Do you frequently feel as though small bugs are crawling over your chest?

If the answer to the first is yes, you are either bored or need more sleep. If the answer to the second is yes, see your doctor—you may have a heart disease. If the third is answered the same way, the author says "don't bother reading the book—you have more pressing things to do."

In such vein does the language range through the serious subjects of heart murmurs, coronaries, strokes, arteriosclerosis, heart failure, and others. It does not make light of these killers but makes them understandable as to what they are, what they do, and how they are treated.

The book concludes with the recovered heart patient's return to work which calls for understanding by all concerned but which usually can be worked out satisfactorily "if he hasn't been needlessly scared out of his wits."

"It happened when I was running to tell the safety man my idea on safety."

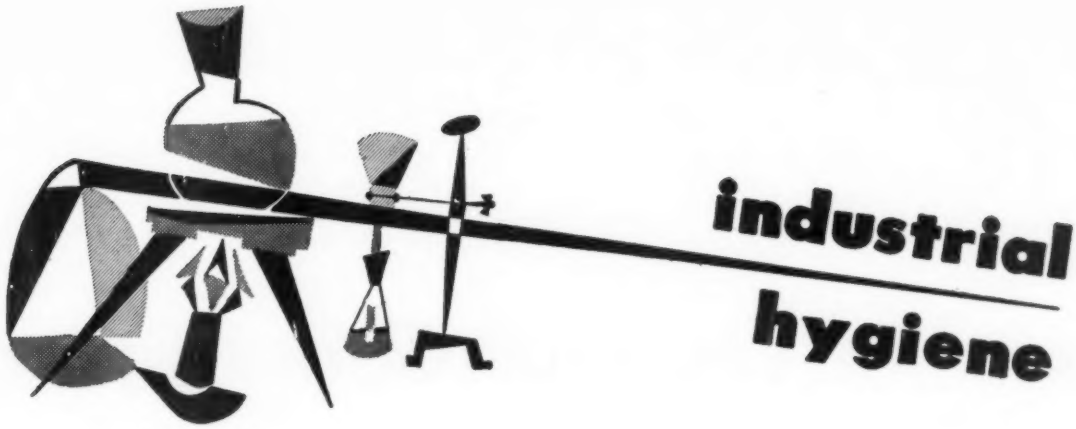
Radioisotope Manual

Nuclear-Chicago Corporation has announced the availability of a new 184 page manual titled "Radioisotope Experiments for the Chemistry Curriculum." The manual, which was prepared under contract for the Atomic Energy Commission's Office of Isotope Development, is designed to introduce the chemistry student to radioisotope techniques and to demonstrate their potential contribution to his future work. The manual reflects the growing routine use of radioisotopes as valuable tools in chemistry and biology laboratories, hospitals, industrial laboratories, and scientific research centers.

Faculty members of Northwestern University, Illinois Institute of Technology, and Pennsylvania State University participated in developing the experiments. Testing was carried out under actual teaching conditions at Pennsylvania State University, Emory University, Loyola University, St. Procopius College, Monmouth College, and Illinois Wesleyan University. Editorial supervision and administration of the project was provided by Nuclear-Chicago under a cost-sharing contract.

The experiments were developed and tested for laboratory groups of thirty students. The students themselves prepare the samples, measure their radioactivity, and interpret the results. Each of the twenty-three chemistry experiments is designed to be easily worked into established courses in Introductory Chemistry, Quantitative Analysis, Qualitative Analysis, Organic Chemistry, Physical Chemistry, Biochemistry, or Instrumental Analysis. Ten introductory experiments illustrate the properties of radioisotopes, radiation, and the instruments involved in their detection. All the experiments may be done without special AEC license, with an inexpensive package of 13 radioactive compounds. Only basic nuclear detection equipment—a scaler, timer, Geiger tube, and mount—is required to conduct the experiments. No previous radiochemical experience by the instructor or students is necessary.

A sample copy of the manual, together with a set of instructor notes, is available to college and university teachers at no charge upon request to Nuclear-Chicago Corporation, 359 East Howard Avenue, Des Plaines, Illinois. Multiple copies for students use may be purchased through Nuclear-Chicago or through the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. at $2 per copy for the experiment manual and $1 per copy for the instructor notes.



Wide Duties for Industrial Physicians

Whether he likes it or not, the industrial physician can no longer stand on the side lines and simply practice medicine; fields which range from administration of employee relations to psychiatry and plant safety have become a major part of the job.

Charting a course through this modern medical maze is the revised book "Modern Occupational Medicine," published recently by Lea and Febiger of Philadelphia. It is based on more than 40 years of Du Pont Company experience with its employee medical program and is written by 23 members of the Medical Division and related groups. It was edited by Dr. Allan J. Fleming, the company's medical director, Dr. C. A. D'Alonzo, assistant director, and Dr. John A. Zapp, director of its Haskell Laboratory for Toxicology and Industrial Medicine.

"No longer can the industrial physician, nurse, or part-time medical consultant to industry stand aloof and function merely in a purely professional capacity," wrote the editors. "Whether the industrial physician approves or not he finds himself involved, along with his medical duties, in the medical and administrative phases of industrial and employee relations, including welfare, pension and sickness benefit schemes."

He is also concerned with preventive medicine and management seeks his guidance on the control of occupational hazards, they point out. Furthermore, although safety programs seem to be outside the medical realm, it has been found that medical problems are often the basic cause of the human failure which causes most accidents.

Unique Opportunity in Industry

At the same time, however, the industrial physician has a "unique opportunity" in his position to study the course of disease "for he alone has an opportunity to repeatedly examine and observe a sizeable group of workers over a period of many years during their life work . . . to observe the beginning, course, and often the end result of such disease. No other group of physicians has this opportunity."

Concerned largely with preventive medicine, the Du Pont Medical Division experimented with and developed much of the work that has now become standard in industry, such as the annual physical examination for all employees. Over the years, its research was expanded to comprehensive success on such problems as toxicology and of man in his working environment. More recent advances include successful developments in such areas as industrial psychiatry and one of the latest, which now appears promising, is its biostatistical research in medical problems.

The book, with each section written by an expert in the field, covers the company's experience in those areas. It was originally planned as a guide for Du Pont's own physicians but the authors have presented information that will be useful to physicians, executives, safety engineers, and chemists throughout industry. It not only provides a complete review of all phases of occupational medicine but presents substantial findings based on original work in specific fields. It was published originally in 1954.

Revised Edition

The extensive revision published now not only brings the book up to date but adds significant new sections to cover the work accomplished since then. A section on chest diseases, not included in the first edition, has been written by an outstanding authority. A new chapter in the section on psychiatry deals with the types of emotional or mental illness commonly seen in an industrial environment, and suggests how industrial physicians may help such employees. In the section on safety, a different approach in safety education is suggested as a means of preventing accidents due to the human element.

In addition, the book goes into detail on the setup of industrial medical organizations, covers the basic areas of industrial preventive medicine, and discusses the area of physical environment and occupational health. Other chapters cover Du Pont's success in rehabilitating alcoholics; studies of fatigue and effects of temperature and humidity; and investigations of pulmonary irritants and the toxic effects of certain chemical compounds.

The book is available at $12 through medical book stores or the publisher: Lea & Febiger, 6th & Washington Sq., Philadelphia, Pa.

Bandage for the arm

Bandage for the finger

Some Tips on

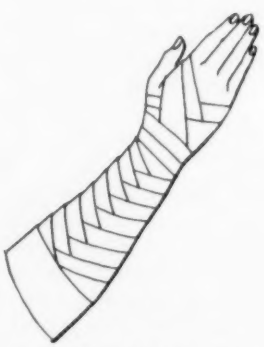
The art of bandaging is said to be as old as medicine itself. From a study of mummies wrapped in linen that had been dipped in gum plaster, there is evidence of bandaging skills dating back to the Pre-Dynastic Egyptian era.

We, however, prefer to use bandaging to save the living instead of to preserve the dead. The proper bandage, properly applied, can aid materially in the recovery of a patient. It is therefore essential that all persons concerned with first aid become familiar with the various bandages and be able to apply them properly.

Modern bandages are made from a variety of materials, such as gauze, muslin, flannel, crinoline, rubber and elastic webbing. The materials most commonly used are gauze and muslin. Gauze bandages are especially widely used because they are light, soft, thin and porous, and can be easily applied.

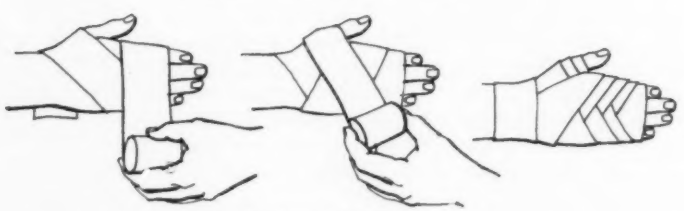
The self-adhering gauze bandage is valuable in emergency bandaging since it can be quickly applied, stays on well, and looks neat. It is used to hold dressings in place, to support an injured part, to create pressure for control of hemorrhage, and to secure a splint to an injured part in order to immobilize it. Since the self-adhering bandage is treated to adhere only to itself—and not to skin, hair, or clothing—it is especially useful for patients sensitive to adhesive tape. It is also available in an oil-resistant type for protection of minor wounds of persons working with oil products.

The technique of bandaging can be mastered only

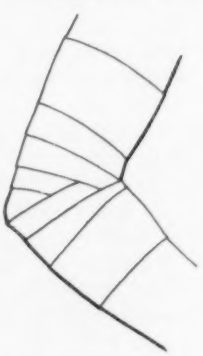


Bandage for forearm

Spica bandage for the finger



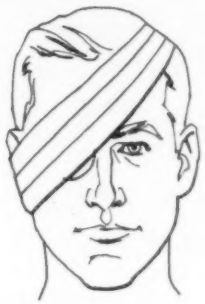
Bandage for the hand



Bandage for elbows

Bandage to cover finger tip

Bandage for the foot



Bandage for eye

Bandaging Techniques

by actual and constant practice. The accompanying line drawings were developed to make bandaging easier for the student and teacher of first aid. The drawings should be helpful in showing the methods and techniques of bandaging the various parts of the body; but a study of these drawings is not a substitute for actual practice in first aid training sessions.

Here are some additional pointers to guide the beginner especially in the easiest and best way to apply bandages:

1. When applying the bandage to a part, hold the roll in the right hand so that the loose end is on the bottom.

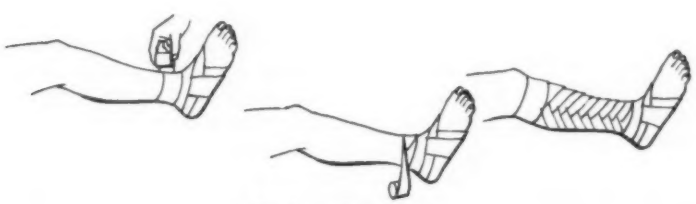
2. The outside surface of the loose end is applied to the part and held there with the left hand.

3. The roll is then passed around the part by the right hand, which controls the tension and direction of the bandage.

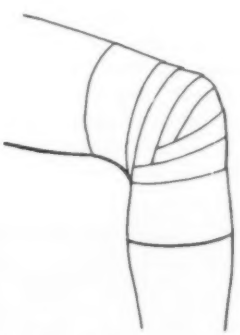
4. The bandage should be applied evenly, firmly, and not too tightly. Excessive or uneven pressure will interfere with the circulation.

5. In bandaging an arm or leg, the entire extremity (except the fingers and toes) should be covered to maintain uniform pressure. The fingers and toes should be left exposed so the circulation in these parts can be checked.

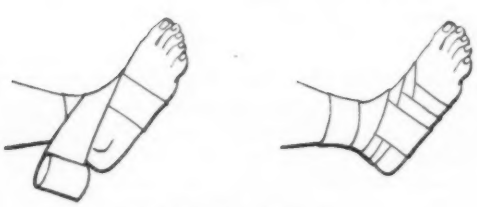
Drawings by courtesy of General Bandages, Inc.



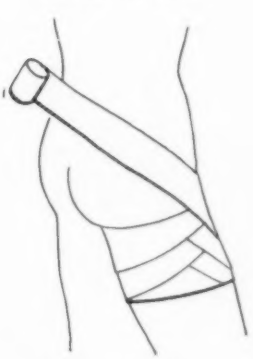
Bandage for the leg



Bandage for knee



Bandage for the ankle



Bandage for hip

Bandage for the heel

A Review of Dust Collection

A useful outline of the types of dust and fume collectors available commercially—where to use them, their advantages and limitations.

In Part 1 of this article, published in the December 1960 issue of "SAFETY MAINTENANCE," the author outlined the various factors that must be considered in selecting dust collection equipment, classified collectors into six general categories, and described three of the categories in detail (settling chambers, inertial separators, and cyclones). The three remaining categories to be discussed in Part 2 include: filters, electrical precipators, and scrubbers.

Filters

Gas filters may be divided into two basic types, the fabric filter and the deep bed filter. The fabric filter is, at present, by far the more important of the two for industrial dust control. The basic difference between the two types lies in the mechanisms by which particle deposition occurs. In a fabric filter, the fabric serves primarily as a filter support, and particulate collection is accomplished during the passage of the gas stream through the previously collected dust cake. Actual "sieving" is a major collecting mechanism. A deep bed filter, on the other hand, consists of a loosely packed mat of fibrous materials which is, in reality, an inertial separator in which the collecting elements are the fibers themselves. Deep bed filters are widely used as domestic furnace filters and on air-conditioning systems but are not common where high grain loadings are encountered.

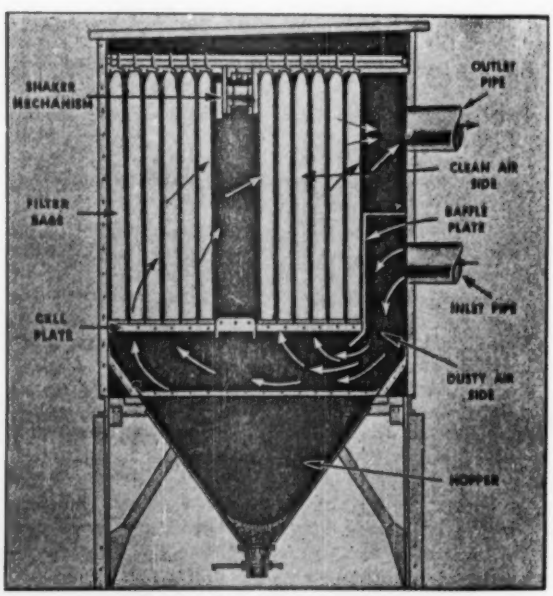


Figure 6: Baghouse Filter

Shake Cleaning: Fabric filters offer high efficiency collection of particles as small as 0.1 micron or less. The most common type is the shaken baghouse in which mechanical or pneumatic shakers are used periodically to clean the collected dust cake from vertically suspended tubular bags (Figure 6). The dust stream enters the collector near the bottom through a combination inlet plenum-dust hopper and then passes upward and outward through the tubes forming a dust cake over their internal surfaces. Gas velocities through the fabric are normally between 1 and 4 ft./min. and maximum pressure drops are usually held to 4 to 6 in. H_2O. Air flow must be stopped when the filters are cleaned but multicompartmented, automatically programmed equipment may be used when continuous service is desired. Woven fabrics are the usual filter media in this type of collector, with cotton sateen the cheapest and most commonly used. Materials used for higher temperature service or to resist chemically active gases include wool, nylon, dacron, orlon, and glass. Normal temperature limits for these materials are: cotton, 180°F.; wool, 220°F.; nylon, 225°F.; orlon and dacron, 275 to 300°F.; and glass, 450 to 500°F. Baghouse inlet temperatures, of course, may be somewhat higher than these limits.

Reverse Jet Cleaning: In addition to mechanical shaking, other filter cleaning techniques are sometimes used. They include reverse jets, collapse cleaning, air pulsing, sonic cleaning, and combinations of these methods. In a reverse jet unit (Figure 7), felts serve as the filter media and cake removal is accomplished by a high velocity jet of compressed air issuing from a narrow slot on a closely fitted or spring-loaded hollow ring which traverses the entire length of the filter. Filter velocities up to 15 or 20 ft./min. are sometimes possible, which means that these units can be appreciably smaller than shaken baghouses of the same volumetric capacity. Also, cleaning is carried out continuously or semicontinuously while air flow continues yielding a relatively constant pressure drop and, therefore, relatively constant flow rate rather than the cyclic fluctuations in flow inherent with periodic cleaning. Disadvantages of reverse jet units are higher purchase and maintenance costs, lower temperature limits (~300°F.),

Equipment:

Part 2

by **DAVID G. STEPHAN**
Senior Sanitary Engineer
U. S. Public Health Service
Engineering Research & Development Unit
Air Pollution Engineering Research
Robert A. Taft Sanitary Engineering Center
Cincinnati, Ohio

and a tendency toward gradual blinding of the felt media with very fine dusts.

Collapse Cleaning: In the last several years, cleaning by collapsing tubular filters with a very slight reverse pressurization has become popular on high temperature units using glass bags. This "single stroke" cleaning appears to decrease filter wear appreciably, a very important matter considering the relatively poor wear-resistance of glass fabrics. The technique, however, may not be satisfactory where "hard to clean" dust-fabric combinations exist.

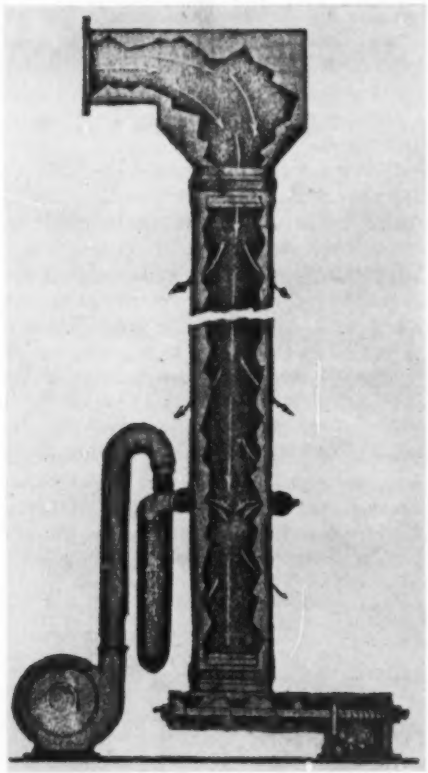


Figure 7: Reverse Jet Filter

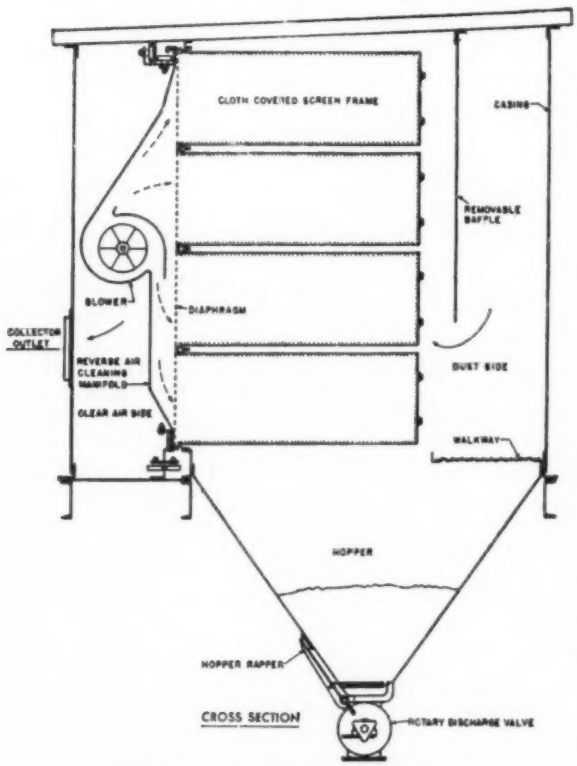


Figure 8: Envelope Filter

Air Pulsing Cleaning: Several manufacturers are also supplying filters in which cleaning is accomplished by air pulsing, i.e., by directing short bursts of high-pressure air into the filter bags, "popping" them open. With this design, the bags are mounted over wire frames and the gas to be filtered flows from the outside to the inside of the bags. Very recently, tubular bag-houses have become available which combine collapse cleaning and air pulsing, and within the last year, filters have come on the market in which low frequency sonic energy is used for cleaning.

Cloth Envelope Filters

Differing in geometry from the tubular filter is the cloth envelope type (Figure 8). Flat filter bags, 1 to 2 inches thick and roughly 2 by 4 feet in size, are mounted over wire frames from a vertical tube sheet. The filter cake is formed on the external surface of these bags and is removed by mechanical rapping. These filters can be cleaned continuously without shutting off the air flow to the unit when specially designed cleaning equipment is employed to supply a slight reverse air flow sequentially to the filter bags during rapping.

Advantages of fabric filters are high collection effi-

DUST & FUME CONTROL SERIES
other articles in Dec. & Feb.

ciency for all particle sizes even when variable flow rates and variable inlet concentrations exist, relatively simple construction, moderate cost, dry collection, and nominal power consumption. Disadvantages relate to size, temperature and humidity limitations, and maintenance costs.

With respect to temperature limitations of this and other types of collectors, it is well to discuss gas cooling briefly. Three methods can be used: 1) cooling by radiation and convection, 2) cooling by evaporation, and 3) cooling by dilution with ambient air. The dilution method increases the volume of gas to be filtered and is normally used only in conjunction with one of the first two methods. Radiation and convection cooling generally requires a greater initial capital outlay than evaporative cooling, but operation is less costly. Evaporative coolers, on the other hand, are usually cheaper to install but require a continuous supply of cooling water and have higher maintenance costs due to wet corrosion. Evaporative cooling is the most popular technique in the foundries of the Los Angeles

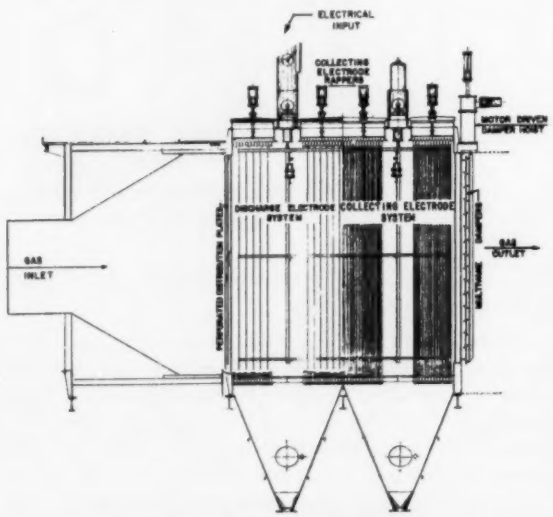


Figure 9: Electrical Precipitator

area where fabric filters have found wide usage. When using evaporate cooling, the biggest concern is with over-humidification and resultant condensation problems.

Electrical Precipitators

High-efficiency collection of particles 0.1 micron in diameter and even smaller under severe operating conditions is offered by the electrical precipitator (Figure 9). Particle deposition is accomplished by passing the gas stream between electrodes across which a high voltage is impressed. The discharge electrode has a much smaller radius of curvature than the collecting electrode and, as a result, corona discharge, and a powerful ionizing field is established near the discharge electrode. Potentials as high as 100,000 volts are used. Particles passing through the ionizing field become charged and subsequently migrate to the collecting electrode. Once deposited, they lose their charge and are removed either by mechanical vibration or by washing.

Both single-stage and two-stage precipitators are in use as particulate collectors. In the two-stage unit, ionization is achieved in the first stage and particle collection in the second. This kind of precipitator is rarely used for industrial dust collection but is employed most often in air conditioning installations.

With the single-stage precipitators, ionization and particle collection occur simultaneously at the same set of electrodes. In plate-type precipitators the collecting electrodes consist of parallel plates, either of solid or expanded metal, closely spaced rows of rods, chains, or wire, or specially formed shapes. In the pipe-type precipitator, the collecting electrodes are formed by a nest of parallel tubes which may be square, round, or octagonal. In each case, discharge electrodes are wires or small, twisted rods, suspended vertically either midway between the parallel collecting electrodes of the plate-type unit or axially along the length of the pipes of the pipe-type unit.

Electrode cleaning is normally carried out while gas flow continues and is accomplished by periodic or continuous mechanical rapping or by a flowing liquid film. Electrodes may range from 5 to 20 feet in length and electrode spacing is usually 3 to 8 inches.

The potential collection efficiency is greatly affected by the electrical resistivity of the particulate matter. Relatively small changes in resistivity can cause appreciable differences in operating characteristics of the precipitator. High-resistivity material results in a reduced potential gradient across the gas space and in back ionization at the collecting electrode; both of these factors contribute to reduced efficiency. The induced lowering of resistivity of the particulate matter being collected is called conditioning. This may be accomplished by humidification, temperature control, or by the addition of chemical agents, notably ammonia, sulfuric acid, or SO_3.

Gas velocities average 3 to 10 ft. per second but, obviously, as velocity increases, retention time decreases, and this leads to reduced efficiency. A common design deficiency is unequal flow distribution. This matter is so important that baffles, guide vanes, or distributor plates are very often used to improve the flow pattern.

The chief advantages of the precipitator are its high efficiency collection under varying and quite severe conditions, high-temperature applicability, low maintenance and operating costs, and low pressure drop. Disadvantages include high initial cost, large size, and possible explosion hazards with flammable materials. Of great importance is the logarithmic relationship of outlet concentration to the size of the equipment. That is, a precipitator giving 90% efficiency must be doubled in size to give 99% efficiency and tripled to give 99.9%.

Scrubbers

In a general sense, "scrubbers" includes gas absorption equipment as well as particulate collectors. How-

TABLE I: APPROXIMATE CHARACTERISTICS OF DUST AND MIST COLLECTION EQUIPMENT

Equipment Type	Purchase Cost* ($/cfm)	Smallest Particle Collected (microns)**	Pressure Drop (in. H_2O)	Power Used*** ($\frac{KW}{1000\ cfm}$)	Remarks
A. Settling Chambers					
1. Simple	0.1	40	0.1–0.5	0.1	Large, low pressure drop, precleaner
2. Multiple tray	0.2–0.6	10	0.1–0.5	0.1	Difficult to clean, warpage problem
B. Inertial Separators					
1. Baffle chamber	0.1	20	0.5–1.5	0.1–0.5	Power plants, rotary kilns, acid mists
2. Orifice impaction	0.1–0.3	2	1–3	0.2–0.6	Acid mists
3. Louver type	0.1–0.3	10	0.3–1	0.1–0.2	Fly ash, abrasion problem
4. Gas reversal	0.1	40	0.1–0.4	0.1	Precleaner
C. Cyclones					
1. Single	0.1–0.2	15	0.5–3	0.1–0.6	Simple, inexpensive, most widely used
2. Multiple	0.3–0.6	5	2–10	0.5–2	Abrasion & plugging problems
3. Mechanical	0.2–0.6	5	——	0.5–2	Compact
D. Filters					
1. Tubular	0.3–2	<0.1	2–6	0.5–1.5	High efficiency, temp. and humidity limits
2. Reverse jet	0.7–1.2	<0.1	2–6	0.7–1.5	More compact, constant flow
3. Envelope	0.3–2	<0.1	2–6	0.5–1.5	Limited capacity, constant flow possible
E. Electrical Precipitators					
1. One-stage	0.6–3	<0.1	0.1–0.5	0.2–0.6	High efficiency, heavy duty, expensive
2. Two-stage	0.2–0.6	<0.1	0.1–0.3	0.2–0.4	Compact, air conditioning service
F. Scrubbers					
1. Spray tower	0.1–0.2	10	0.1–0.5	0.1–0.2	Common, low water use
2. Jet	0.4–1	2	——	2–10	Pressure gain, high velocity liquid jet
3. Venturi	0.4–1.2	1	10–15	2–10	High velocity gas stream
4. Cyclonic	0.3–1	5	2–8	0.6–2	Modified dry collector
5. Inertial	0.4–1	2	2–15	0.8–8	Abrasion problem
6. Packed	0.3–0.6	5	0.5–10	0.6–2	Channeling problem
7. Mechanical	0.4–1.2	2	——	2–10	Abrasion problem

* Steel construction, not installed, includes necessary auxiliaries, '60 prices.
** With ~ 90–95% efficiency by weight.
*** Includes pressure loss, water pumping, electrical energy.

ever, in current air pollution control usage, the term generally applies to devices which utilize a liquid to achieve or assist in the removal of solid or liquid dispersoids from a carrier gas. Water is by far the most common liquid employed, but in certain special cases, other liquids have been used.

Scrubbers are constructed in such a wide variety of designs that no single type can be considered as representative. Some scrubbers are simply previously existing dry-type collectors which have been modified to allow the introduction of a liquid phase; other units are specifically designed as wet collectors.

Particle collection is generally achieved by one of four mechanisms: 1) the particles may be made to impinge on a liquid surface, 2) the particles may be allowed to diffuse to a liquid surface, 3) the liquid may condense directly on individual particles, increasing their size and thereby their ease of collection, or 4) the carrier gas may be partitioned into a number of very small individual elements within which particles are collected by Brownian diffusion and gravity settling.

According to theory, collection by the impingement mechanism should increase in efficiency as collecting droplet size decreases. This is true to a point, but as spray droplet size falls below 30–50 microns, impingement efficiencies decrease rapidly, since smaller droplets are accelerated almost instantaneously to the carrier gas velocity and then no *relative* velocity exists

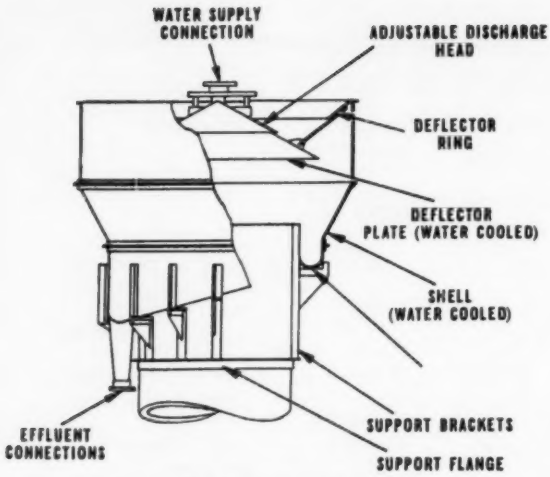


Fig. 10: Cupola Wet Cap

between the droplets and the particles to be collected. Impingement is most effective for particles larger than 5 microns. For finer particles, the diffusional mechanism becomes of increasing importance.

Condensation occurs when the carrier gas is cooled through its dew point. Submicron particles serve as condensation nuclei. As a result, effective particle size is increased, thereby enhancing inertial collection. This mechanism, however, is generally effective only where hot gases containing relatively low loadings are concerned. Gas partitioning is achieved by dispersing the carrier gas into small volumetric increments, i.e., small bubbles or foam. Here, efficiency of collection increases as the size of the incremental gas volumes decreases.

In most practical applications, the particles to be collected cover a range of sizes and more than one mechanism plays a part. Regardless of the mechanism, however, high efficiencies are favored by large interfacial areas, and, therefore, small droplet size is advantageous. Also, current thinking is that properly designed scrubbers will be highly efficient collectors for any particle size, **if the power input to the scrubber is high enough.** Power may be consumed by high pressure atomization of the liquid phase, by high velocity jetting of the liquid, by high carrier gas velocities, or by mechanical energy input to rotating elements. Available commercial scrubbers offer high efficiency collection of particles larger than about 5 microns at relatively low power input, of particles in the 2- to 5-micron range at moderate power input, and of particles down to 1 micron or below with high power consumption.

Scrubbers may be grouped roughly in seven design types. The first, and most common, is the **spray tower.** These units are simply chambers in which the carrier gas passes through banks of sprays positioned either parallel or normal to the gas stream. The sprays are followed by some type of inertial collector which serves as a mist entrainment separator. A common example of this type collector is the cupola wet-cap (Figure 10). For such units, water consumption runs about ½ to 2 gallons/1000 cu. ft. of gas. Pressure drops are usually in the range of 0.1 to 0.5 in. H_2O.

In the **jet scrubber** (Figure 11), a high velocity water jet is directed axially into the throat of a venturi section. This is followed by an entrainment separator, usually a simple gas-reversal chamber. These units serve as collectors and also may act as aspirating-type air movers. Pressure gains up to as much as 7 or 8 in. H_2O may be developed. Water consumption is very high, often in the range of 50 to 100 gallons/1000 cu. ft.

Of somewhat similar design is the **venturi scrubber** (Figure 12). In this scrubber, it is the gas phase which is passed through the venturi throat at high velocity (200–300 ft./sec.). Water sprays are injected just preceding the throat and the entrained droplets are subsequently removed by a cyclonic separator. For these units, water consumption is normally 3 to 10 gallons/1000 cu. ft. and pressure drops range from 10 to 15 H_2O. For collection of fine fume, for example, pressure losses of 30–35 in. H_2O may be required.

In **cyclonic scrubbers,** radial sprays are introduced into typical dry-type cyclones. The liquid phase assists in collection and also serves to decrease reentrainment. Pressure drops are usually 2 to 8 in. H_2O and water consumption is roughly the same as for the venturi scrubber.

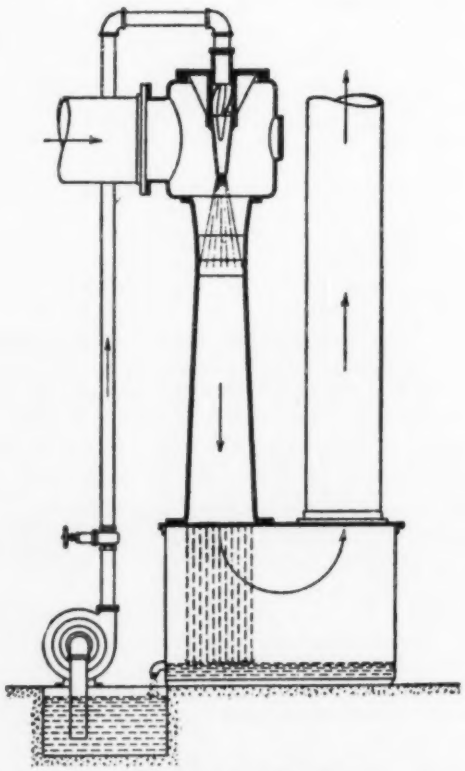


Figure 11: Jet Scrubber

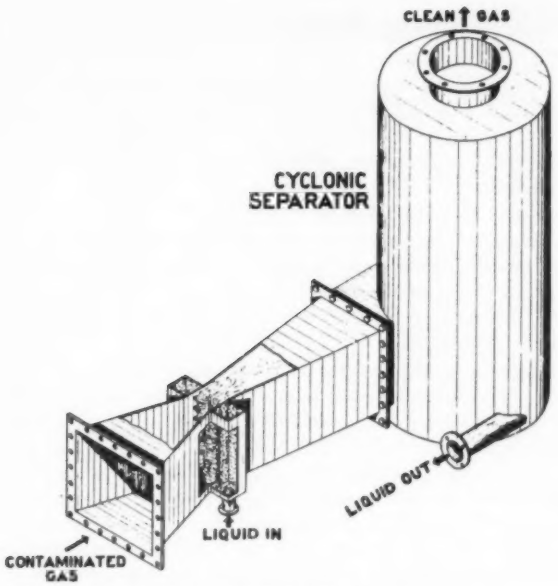


Figure 12: Venturi Scrubber

When particle-liquid contact is obtained as the result of the carrier gas velocity itself, the scrubbers are classified as **inertial scrubbers.** They are of two types. One is the *impaction scrubber* in which the liquid and gas phases are intimately mixed and then impacted onto a baffle plate, and the second is the *deflection-type scrubber* in which the gas stream impinges on liquid-film covered baffles. In the former type, impaction velocities are from 30 to 150 ft./sec. and pressure drops may be as high as 30 in. H_2O. In the latter, pressure drops are appreciably lower, ranging up to about 6 in. H_2O.

Packed scrubbers are conventional, packed tower liquid-gas contactors. Packing may be composed of Raschig rings, Berl saddles, fiber glass, etc., and gas and liquid flows are normally countercurrent. The separating mechanism is believed to be primarily impingement of the particles on the packing with the liquid medium serving merely to clean the packing surface. Excessive velocities through these units produces channeling with resultant loss of efficiency. Pressure drops range from ½ to as high as 10 in. H_2O.

In the final category are the **mechanical scrubbers** (Figure 13). Here, liquid-particle contact is achieved by the simultaneous introduction of the liquid medium and the gas stream onto rotating disks, blades, or perforated plates. In some cases, stationary members are alternated with the rotating elements.

Advantages associated with scrubber collectors are relatively high efficiency collection of particles in the 5–10 micron range at nominal power consumption, potentially high efficiency collection of smaller particles with adequate power consumption, moderate initial cost, and applicability for high temperature service. Among the disadvantages are wet disposal of collected material which can lead to water pollution problems, high power usage for high efficiency collection of fine particles, and moderate to high maintenance costs due to wet corrosion and abrasion.

Conclusion

Presented in Table I is a summary of the general performance specifications for the various type of dust collection equipment. Included are approximate cost figures for the various types of collectors.

It is important to remember that, from a technological standpoint, all particulate emissions **can be controlled** to better than 99+% efficiency through use of appropriate collection equipment. It is equally important to remember that cost of collection increases with collection efficiency, with the severity of the collection conditions, and with decreases in particle-size of the material to be collected. If required collection efficiency is based on local air pollution control legislation, the criterion for satisfactory control normally is based on either effluent loading (grains/ft.^{3}) or upon plume opacity (Ringelmann Number). If the requirement is in terms of effluent grain loading for the process concerned, then collection equipment may be selected on the basis of an over-all collection efficiency by weight. However, if plume opacity is of concern, then even very high weight collection efficiencies, e.g., 98+%, may be unsatisfactory, since the very small particles contribute little to weight but by far the most to light scatter because of their high surface-to-weight ratio.

The selection of a dust collector for a given application, therefore, requires consideration of the various possible types in terms of all the selection criteria outlined earlier, but the most important of these must inevitably be collection efficiency. In short, the collector must do the job it is supposed to do.

Pictures for Parts 1 & 2 of this article by courtesy of the following companies: Aerodyne Development Corp.; Kirk & Blum Mfg. Co.; Western Precipitation Corp.; American Air Filter Co., Inc.; Wheelabrator Corp.; Day Co.; Pangborn Corp.; American Foundrymen's Society; Schutte & Koerting Co.; and Chemical Construction Corp.

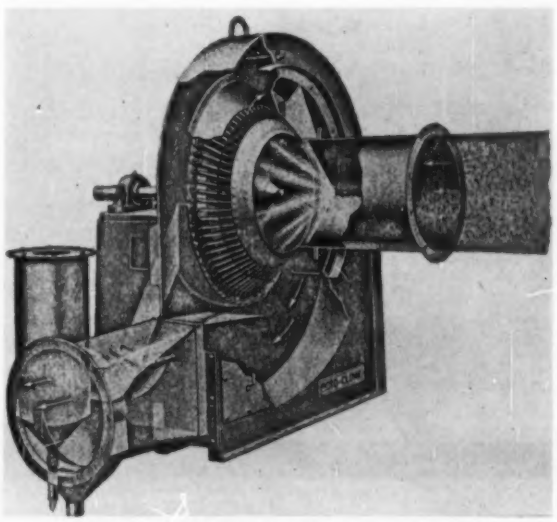


Figure 13: Mechanical Scrubber

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New Hygiene Guides

The American Industrial Hygiene Association announces the addition of five new guides to the Hygienic Guide Series entitled Acetonitrile, Diethylamine, Diethylene Triamine, Nitropropane, and Tetrachloroethylene.

Each Hygienic Guide is devoted to one substance. It contains the most recent available information on potential hazards, standards for allowable exposures, industrial hygiene control practices, and specific medical procedures for treatment of persons overexposed to the substance.

The value of the type of information made available in the Guides can be best shown with an example. Tetrachloroethylene—commonly known as perchloroethylene—has been widely used as a degreasing and dry cleaning solvent with relatively few instances of serious illness or death being reported. In cases of excessive exposure, it has been known to cause injury to the nervous system and probable damage to the liver. Instrumental and chemical procedures for monitoring air concentrations are described in detail. References are cited for each of the categories.

Copies of the Guides are available from the American Industrial Hygiene Association, 14125 Prevost, Detroit 27, Michigan at 25¢ each. Remittance must accompany orders for $2.00 or less. A discount of 20% is allowed on orders of five or more, and a 40% discount allowed for orders of 100 or more copies. Each Guide is a single sheet. A specially designed dark blue looseleaf binder with white lettering is available at $1.25. No discount on binders.

Nuclear Disposal Containers

The Atomic Energy Commission has issued for public comment a proposed regulatory amendment which would establish design and packing criteria for containers used in sea disposal of low-level radioactive waste material.

The proposed criteria require that containers maintain their integrity until they reach at least 1,000 fathoms (6,000 feet), the disposal level required by Commission regulations.

Commission standards for sea disposal are based on the fact that the ocean water will safely dilute and disperse the low level wastes which are permitted to be disposed of at sea. The Commission, as a conservative approach, requires disposal at not less than 1,000 fathoms, and in a recent decision in a waste disposal case, it stressed confining the wastes until the containers reach this required disposal depth.

The proposed amendment also provides for authorization for disposal at sea of waste radioactive metal without a disposal container, where it is shown that the metal will sink to 1,000 fathoms. An example of this type of waste is scrap thorium magnesium alloy which consists of metallic fragments resulting from missiles which have been destroyed. The alloy typically would contain such a low percentage of radioactive thorium (0.1%) that the handling and disposal of the material would be safe.

inside the trade

DAVID CLARK CO., Worcester, Mass., manufacturers of air and space crew personal equipment, medical and safety equipment, including hearing protection devices, has announced two promotions. *Charles W. Kaufman*, formerly Project Sales Coordinator, has been named Manager of Safety Product Sales. *Armand R. Cassavant*, formerly representative for special environmental equipment, becomes Manager of Distributor Sales. Kaufman, now beginning his ninth year with the company, came to Clark as an expediter on government orders.

A new Southeastern Warehouse has been announced by *THE FIBRE-METAL PRODUCTS CO.* of Chester, Pa. Fibre-Metal Southeast, Inc. of Decatur, Georgia will distribute Fibre-Metal Products, Glendale Optical Company Products and J. M. Ragle Industries Products to Welding and Safety Supply Distributors of the Southeastern United States. Services will include shipment from Decatur Stocks, Field Sales Assistance and Promotion and extension of all Factory Services. Operations started in October, and will be directed and guided by *Deric B. Pepler*, General Manager.

Also announced is the appointment of *Joseph J. Hauser* to the sales staff of the Decatur operation. Both Pepler and Hauser have completed intensive training programs with Fibre-Metal and Glendale Optical.

Edgar N. Luckey

Edgar N. Luckey, former director of sales of *WELSH MFG. CO.*, died suddenly October 17th while attending the 1960 National Safety Congress in Chicago, Illinois. He was 69 years old. Mr. Luckey had been active for over 30 years in many capacities in both the industrial safety and welding field. He was a member of Veterans of Safety. He is survived by his widow in Baltimore, Md.

THE ELECTRO SWITCH CORP. of Weymouth, Mass., announces the acquisition of machinery, equipment and manufacturing rights for the Leonard Rotary Geared Pump. The purchase was made from Potter-Horn, Inc. of Boston, Mass. Manufacturing operations are being moved from Osterville to the company's main plant in Weymouth, and production will continue on a regular basis. Several engineering changes and improvements have been made and testing is being done to determine if increased ratings have been achieved. Distribution will continue to follow the same pattern as in the past and orders may be placed with local Fire Equipment Distributors.

LYON METAL PRODUCTS, INC., of Aurora, Illinois, announced that *A. W. Piggot* has been appointed Assistant Manager of New Product Research and Contract Sales Department, under H. G. Knuth. Mr. Piggot is a former Sales Executive of Lyon.

John T. Monahan

The appointment of *John T. Monahan* as general manager of the *Safety Products Division* was announced recently by *AMERICAN OPTICAL COMPANY*. He replaces *Charles H. Gallaway*, vice president and general manager, who is retiring from active operational management.

Monahan will report directly to Victor D. Kniss, executive vice president. Monahan was graduated from Holy Cross College with both a Bachelor and Master of Science degree. He engaged in research at Holy Cross, and was a chemistry instructor, and later received a certificate in industrial engineering from Worcester Polytechnic Institute.

Monahan joined American Optical at Southbridge, Mass., in 1944 as a development engineer. In 1946, he was transferred to the Safety Products Sales Department. He later was promoted to manager of respirator and specialty, assistant sales manager and in 1952 became safety products sales manager.

The new general manager is president and a trustee of the Industrial Safety Equipment Manufacturers Association and has worked on several association committees to develop specifications for safety equipment. A councilor of the United States Chamber of Commerce and a member of the Canadian Standards Association, he has also been an active member of the American Chemical Society, American Industrial Hygiene Association and the American Society of Safety Engineers.

Gallaway will continue as an AO employee on special consulting assignments to the Safety Products Division. He joined American Optical in 1914 as an order clerk and became a vice president in 1957.

HY-TEST SAFETY SHOES, a division of the *International Shoe Co.*, conducted a shoe fitting seminar during the National Safety Congress and Exposition at Chicago. It was the second seminar and the first national seminar conducted by the company, according to *Norman C. Whitsett*, general manager of Hy-Test Safety Shoes. A previous seminar was held in New York City in early fall.

Over 250 safety personnel attended the seminar. An overflow crowd necessitated a repeat program the next day. Safety personnel who attended the meeting will receive a certificate of achievement.

In charge of the educational program was *Vince LoDuca*, sales co-ordinator for Hy-Test Safety Shoes, assisted by *Edward Hauer* and *Robert Crenshaw*, Hy-Test personnel.

The program outlined safety shoe construction, and proper shoe fitting.

ANSUL CHEMICAL COMPANY, Marinette, Wisconsin, producer of fire equipment for home and industry, announces the formation of *Ansul Chemical Company de Mexico SA de C.V.* to handle the manufacture sales and service of a complete line of fire equipment in Mexico. Ansul Mex is a subsidiary of Ansul International Corporation S. A., a wholly owned subsidiary of Ansul Chemical Company.

The new company, which began operations on June 1, 1960, is directed by *Pol Vandenpeerboom* as vice-president and general manager. With approximately 10,000 square feet of office and warehouse space at Sullivan 113, Mexico DF, the new firm has complete service facilities including a field service truck.

A major expansion of the inspection service department of *"AUTOMATIC" SPRINKLER CORP. OF AMERICA*, Youngstown, Ohio, manufacturers and installers of standard and custom-engineered fire protection systems has been announced by J. J. Power, Jr., executive vice president. This expansion will boost

the company's number of specially trained inspectors to over 100 and will provide prompter, more economical service to subscribers by making inspectors available in every area of the United States.

Recommended by insurance rating organizations and fire prevention agencies, the service provides a program of periodic tests and inspections of all types of fire protection systems at regular intervals.

Contributing to the increased demand for inspection service, Power said, is the growing number of installations of special hazards fire protection systems such as fire-fog, foam-water deluge, CO_2 and dry chemical, for which property owners prefer specially trained inspectors.

Following the inspection, a complete report on the condition of the system along with any recommendations is submitted to the subscriber and upon request will be forwarded to the insurance bureau. H. C. Cleary, who has headed the department for the past six years, and himself a veteran inspector, will continue to serve as Supervisor of Inspection Service, according to Power.

THE CHICAGO EYE SHIELD CO. has announced the appointment of *The Guardian Safety Equipment Co.* as its new distributor to serve the New York, New Jersey area. The Guardian Safety Equipment Co., a division of Safety, Inc., has recently established new offices and warehouse at 37 E. 21st Street in Linden, New Jersey. Guardian is headed by Fred R. LaForce, President, Chas. M. Boyd, General Manager, H. A. Polkinghorne, Office Mgr. plus a capable staff of outside salesmen. In addition to the Cesco line, Guardian is a franchised distributor for Scott Aviation, Johnson Williams, Fiber Metal Products, Medical Supply and other leading manufacturers. Guardian carries a complete stock to serve upper and western New York, New York City and the metropolitan area and Northern New Jersey.

Over a hundred employees and representatives of the *CONCO CHEMICAL CO.* were in Dallas at the Baker Hotel on November 18 and 19 to attend the General Sales Convention and observe the firm's 15th Anniversary in business.

Conco started in November in 1945, after Lacy E. Crain returned from overseas duty with the Air Force.

Edward A. Clark, Consulting Engineer, has relocated for the purpose of establishing a new office to serve North and South America. This office will probably be in central Arizona. Mr. Clark's previous assignment was as Safety Director, Ordnance Weapons Command; with prior experience in both private industry and government in many foreign countries as well as the U. S. His understanding of Spanish and Portuguese (Brazil) will be helpful; he has written management guides in these languages, as well as acting as interpreter for military missions visiting this country.

Mr. Clark is a member of many professional engineering societies, is registered to practice in several states, and is now writing an engineering text for management which will later be translated.

The scope of coverage of this new service will include all facets of Fire Protection, Industrial and Transportation Safety, and Occupational Health. Mr. Clark's tentative office is Box 265, Sedona, Arizona, until permanent facilities are arranged.

James F. Camp, Jr.

James F. Camp, Jr. has been appointed sales manager for *ROSE MFG. CO.*, according to company Vice President and General Manager Jon Sharp. The 30-year old Denver firm, headed by its founder Clarence W. Rose, is one of the country's leading manufacturers of industrial safety belts, automobile seat belts, ladder shoes and other safety devices.

Camp's ten years' of sales experience includes former positions of regional representative for Avis Rent-A-Car System and more recently Central Regional Manager for the Briggs Division of the Gabriel Co. Both positions stressed sales and the importance of close liaison between the national company and the local branch. Camp as sales manager for Rose Manufacturing will work closely with forty-five distributors serving fifty states and Canada.

WILLSON PRODUCTS announces the formation of a distributor advisory Plan Board that will assist in creating, developing and evaluating future Willson safety equipment along with advertising, merchandising and sales promotions.

Board members include: *Ed. Hendess,* W. S. Wilson Corporation, Long Island, N. Y.; *Harrison Smith,* Syracuse Safety Services, Syracuse, N. Y.; *Tony Tiller,* Protective Equipment Co., Chicago, Illinois; *John Morgan,* Safety Engineering and Supply Co., Birmingham, Alabama; *Bill Hipp,* Willson District Manager, Detroit, Michigan; *Arthur Karstaedt,* Willson Customer Relations Manager and board chairman; *Robert Moore,* Willson merchandising coordinator; *Jack Glynn,* Willson advertising and merchandising counselor for H. H. Monk and Associates, Willson's advertising agency. Permanent board members are from Willson's sales and merchandising staff.

According to Willson Industrial Sales Manager, *W. C. Weeks,* the idea is to provide a continual flow of professional, field oriented ideas that will coordinate, evaluate and positively expand the Willson line of safety equipment and the company's sales and service effort.

Conferees at the annual International Distributors meeting of the *E. D. BULLARD CO.*, held recently in Chicago, learned that *George C. Andrews* had been named to the newly-created post of Director of Marketing. In making the announcement of this promotion for Andrews, *E. W. Bullard, Jr.*, Vice President-Sales, pointed out that it is another key move in the expanding activities of the Sausalito (Calif.) firm, long established as the West's largest manufacturer of safety equipment for business and industry.

Mr. Andrews has been with the Bullard company since 1953, starting as advertising manager and then adding the duties of public relations director in 1956. He is also editor of the company's nationally-distributed publication, *What's New in Safety.* Born and educated in Chicago, he has been involved with advertising and public relations since 1941, with time out for Army service from 1942 through 1945.

Mr. Andrews is currently president of the Northern California Chapter, Association of Industrial Advertisers. Other affiliations include the Reserve Officers Association, the American Marketing Association, the Public Relations Society of America, the San Francisco Advertising Club, and the (San Francisco) Press and Union League Club.

The National Association of Industrial Glove Distributors successfully concluded its second Fall Meeting at the Sheraton-Blackstone Hotel in Chicago on October 19, 1960. Presiding was the President, Mr. Albert Pransky of David L. Pransky and Sons, Philadelphia.

The meeting was well attended by both regular (distributor) and associate (manufacturer) members, and by prospective members. A panel discussed the subject of "Perpetual Inventory." Other sessions considered and discussed proposals for setting up standards covering weights of cloth and gloves as a means of protecting the ultimate glove consumer against inferior quality. This resulted in the appointment by the Association of a Standards Committee to draft specific recommendations for future consideration.

Roy E. Poe, Midwest District Manager of Welding Engineer Publications, Inc., presented a checklist of 16 items which manufacturers could do to help distributors, and 10 items which distributors could do to help manufacturers. For the manufacturer, this list included such recommendations as (a) guarantee all merchandise against defects in workman-

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ship and materials, and make immediate replacements against such defective merchandise; (b) provide adequate discounts to the distributor, based on realistic list prices that can be maintained by a distributor; (c) have a distribution policy that is realistic, based on the potential; etc. For the distributor, Mr. Poe's recommendations included (a) having a clear understanding of the manufacturer's sales policy, discounts, terms of sale, return merchandise policy and other items pertinent to their relationship, and asking the manufacturer to provide this information in writing; (b) insuring that sales personnel know the manufacturer's merchandise, its sales points, its qualities, and what it will do for the customer; (c) keeping rush orders at a minimum; etc.

The meeting also received an interim report on an industrywide survey questionnaire of stocking distributors of industrial work gloves, designed to result in such meaningful information as methods of compensating salesmen; percentage breakdown of industrial glove sales by component materials; etc.

April 10–11 were approved as the dates of the 1961 Spring Meeting. This is in conjunction with the Greater New York Safety Council Meeting which will be held in New York City during the week of April 10. All stocking distributors and manufacturers of work gloves for industrial consumers are cordially invited to attend the 1961 Spring Meeting.

The Association's new headquarters are at 11 West 42nd Street, New York City, and the new Executive Director is the trade association management firm of Penn Affiliates, Inc.

Construction of a new modern factory is now complete at The Old School Manufacturing Company work clothing plant at Prosperity, South Carolina, with all sewing operations for work shirts and pants transferred to the new building. The Old School Manufacturing is a producing unit of *M. SETLOW & SON, INC.* of Orange, Connecticut, who dedicated a new modern office and industrial building there on July 29th of this year. The South Carolina factory was started by the Setlow firm in 1958 in what had been a former high school. Of masonry fireproof construction, the new building stands alongside of the original quarters and it is electrically heated and air-conditioned for summer and winter comfort.

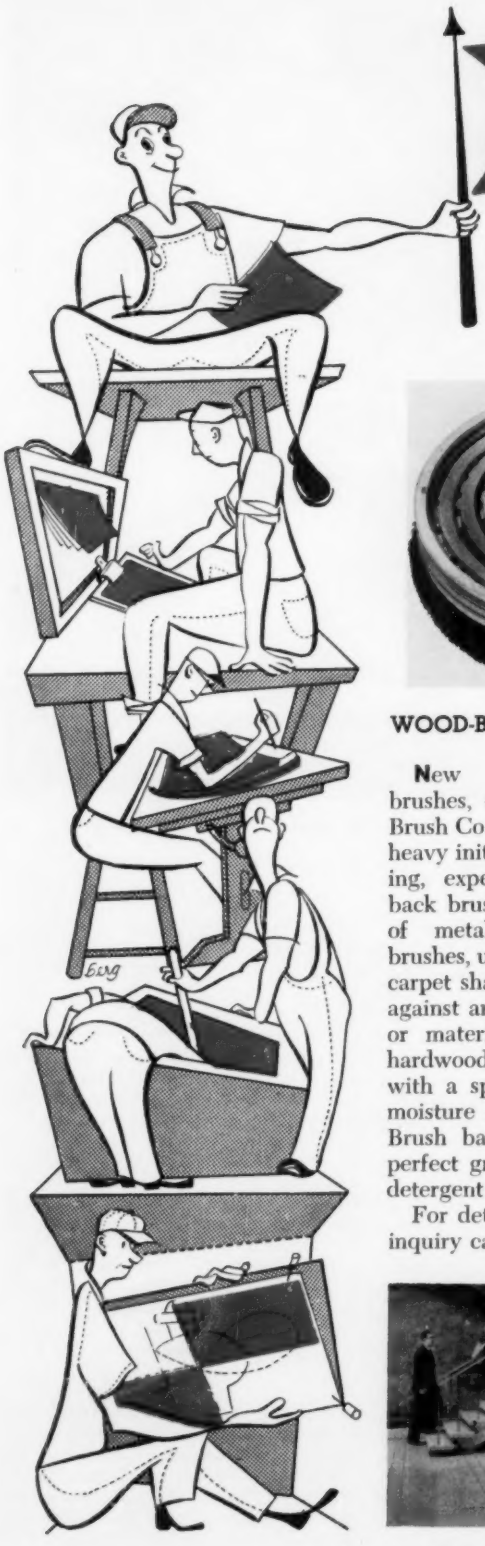
If you're in a position to recommend or order the wearing of safety equipment, it's a good idea to know all about the product and to see how it is manufactured. That, in substance, was the purpose behind the recent visit of the Safety Committee of the National Constructors Association to the Palatine, Illinois plant of the *SELLSTROM MFG. CO.*, leading makers of eye and face protection products.

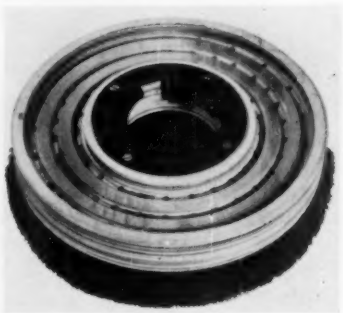
Ten members of the committee made the plant tour, all of them representing their companies as safety directors. Occasion of their visit was the quarterly meeting in Chicago of the Safety Committee of the N.C.A., to which most of the nation's important construction engineering firms and builders belong. Heading the group was Louis H. Bornoff, The H. K. Ferguson Co., Cleveland, the committee chairman. The visitors were brought to the Sellstrom plant by helicopter from their downtown Chicago meeting place 30 miles away.

THE FALCON ALARM COMPANY of Summit, New Jersey, exclusive distributors of Clark-Cooper air horns and compressors, recently showed for the first time their trailer mounted horn testing unit at the meeting of the New Jersey Industrial Fire Chiefs Association held in New Brunswick, N. J.

The trailer mounted unit was developed by the Falcon Alarm Company because of repeated requests to test and demonstrate horns for municipal and institutional use.

KEEPING UP WITH





WOOD-BACK SHAMPOO BRUSH

New wood-back showerfeed brushes, developed by Flour City Brush Co., are said to eliminate the heavy initial cost and time consuming, expensive refilling of metal back brushes, as well as corrosion of metal parts. The Flo-Pac brushes, used for wet scrubbing and carpet shampooing, are guaranteed against any defect in workmanship or material. They are made of hardwood plywood impregnated with a special sealer to eliminate moisture absorption and warpage. Brush back is designed to allow perfect gravity feed of cleanser or detergent to surface being cleaned.

For details, use **Key # FM-1** on inquiry card on page 1.

SLIP-RESISTANT POLISH

A new non-slippery, wax-free floor polish called Contrast has been introduced by Huntington Laboratories. It was developed to prevent discoloring or darkening of vinyl, asphalt tile, vinyl asbestos, linoleum, terrazzo, rubber tile and other floors. The self-shining polish has a water base which will not discolor even pure white floors, while producing a tough, glossy finish which withstands heavy traffic. One gallon will cover approximately 2,000 square feet; it will not water spot, powder or flake off, and resists black marks and scuffs. Contrast requires no buffing except after heavy use. Traffic lanes may be easily patched, and worn surfaces recoated. The only daily maintenance, as a rule, is mopping with a treated dust mop.

For details, use **Key # FM-2** on inquiry card on page 1.

MEASURED MOP BUCKET

New 44 quart round galvanized and stainless steel Measurite mop buckets, available from Market Forge Co., are graduated in gallons for exact measurement of floor cleaning solutions. Embossed on each bucket for permanent identification and inventory-keeping is the total capacity of the bucket, visible inside and out. Also offered are the Squeeze-Easy mop wringer for all mops from 12 through 32 ounces, and the completely adjustable Poly-Dolly bucket truck.

For details, use **Key # FM-3** on inquiry card on page 1.

FLOOR MAINTENANCE DEVELOPMENTS

LUMINOUS NON-SLIP SURFACING

Addition of another safety feature to its X-L Veneer non-slip floor surface is announced by Monroe Co., Inc. The topping, which can be used over concrete, wood, steel, tile or terrazzo, is available in a luminous yellow. The new color, which glows in the dark, is especially effective on dark steps, ramps and depressions of any type. Applied on steps, inclines and floors, the topping forms a thin, tightly bonded veneer that is slip-resistant, whether wet or dry. Easily troweled on without primer, it is impervious to oil and grease, resistant to gasoline, alcohol, fats and chemicals, and is fire retardant, the company reports.

For details, use **Key # FM-4** on inquiry card on page 1.

RIDER-TYPE SWEEPER

A rugged, rider-type power sweeper, designed to withstand around-the-clock use, has been introduced by Clarke Floor Machine Co. Model CHD-36 sweeps a 36 in. swath and can be equipped with one or two side brooms for a swath of up to 58 in. Its all-unitized welded body has ¼" steel side plates and a 3/16" channel steel protective bumper encircling the entire machine. It has a 66" turning radius, and power for sweeping inclined ramps.

A new hydraulic system, powered by a 15 hp gasoline engine, propels and operates the sweeper. One foot pedal controls forward and reverse movement. The sweeper travels at speeds up to 6 mph and sweeps up to 100,000 sq. ft. of floor area per hour. Virtually dust-free sweeping is reported.

For details, use **Key # FM-5** on inquiry card on page 1.

MACHINE RENTAL LINE

A new line of rental machines, called the Gold Line, has been introduced by the American Floor Machine Co. It consists of a 12" scrubber, 3 gallon vacuum, 8" drum sander and a 5" edger. The scrubber is designed for the wet and dry rug shampooing, scrubbing, waxing and polishing floors, and features a positive-action foot lever for controlling the 90° adjustable handle, bar type safety switch, and a wide rubber bumper for protection of furniture and walls. Companion vacuum has a triple filter for holding particles missed by most filters, a wide 4-caster base to prevent tipping and non-mar rubber bumper, among other features.

The Gold Line sander has both lever control and detachable handle. Built-in constant drum pressure virtually eliminates all gouges and ripples. The handle, sealed dust-free motor with five year guarantee, attached paper template, and full felt drum are a few of the exclusive features. The edger has a precision balanced 5" disc operating at a speed of 3000 rpm. A free rolling disc guard protects the rubber pad, yet allows sanding right to the edge without removing shoe-strip or baseboard. The full aluminum skirt assures complete dust pick-up at all times.

For details, use **Key # FM-6** on inquiry card on page 1.

MOP & TANK EQUIPMENT

Maintenance problems encountered in stainless steel kitchens with tile walls and floor can be handled with greater money and time economy by using proper size mops and tanks of sufficient economy, states the White Mop Wringer Co. Model pictured has all around vinyl bumper and high leverage wringer on a dual compartment tank.

New model mop handles, Nos. 93 and 937, are electroplated to provide longer life under the strenuous use. The bail is formed to fit securely into a socket to prevent loosening or slippage. Special center bolt design assures that the mop will be held more firmly in place.

For details on Tank Equipment, use **Key # FM-7** on page 1.

For details on Mop Handles, use **Key # FM-8** on page 1.

FLOOR FINISH ENDS SCUFF WITHOUT POWDERING

Scuff resistance without powdering has been achieved with a new polyurethane-fortified liquid floor finish. The product was developed by Allied Chemical Co. and Cellowax Co. One man re-finished a vinyl tile floor waiting room in about half the time previously required. The product, Cellowax Liquid Safety Floor Finish, is applied with a string mop, after the old finish has been removed, and allowed to dry for 30 minutes; then another thin coat is applied; the second coat dries to a glossy finish without buffing. The new finish is said to have a high coefficient of friction which guards against slipping even on rainy days. The product will not yellow light colored floors, the manufacturer states.

For details, use **Key # FM-9** on inquiry card on page 1.

NEW WAX APPLICATOR

Self-contained automatic-feed wax applicators, said to eliminate wax smears on baseboards and furniture, are being manufactured by Power-Flo tools. The Power-Flo Waxer stores almost a quart of wax in its handle; a completely enclosed valve allows wax to feed to the 16-inch applicator head when the handle is pressed down; the head swivels to allow waxing under and around furniture and obstructions. St. Luke's hospital in New York reported significant savings in material, as well as a 25% saving in time, in using the new tool; they formerly applied floor wax with cut-down mops.

For details, use **Key # FM-10** on inquiry card on page 1.

GRADUATED MOP BUCKETS

Mop buckets that facilitate correct mixing of cleaning solutions and eliminate extra measuring cups and pails are available from Geerpres Wringer, Inc. The buckets are ribbed for additional strength and each rib is a graduation that tells at a glance how may gallons are in the bucket. The new feature is included at no extra cost in 4-, 8-, and 11-gallon sizes with choice of single, twin, or "Convertible" twin models. Models include bucket alone, bucket mounted on ball-bearing rubber-wheeled casters, and bucket on casters with a non-marking rubber bumper. The buckets are hot-dip galvanized after fabrication, and have no bolt and rivet holes, eliminating danger of leaks or rust.

For details, use **Key # FM-11** on inquiry card on page 1.

NEW PATCHING COMPOUND

A highly adhesive, epoxy-type floor patching and resurfacing compound, having an impact and abrasion resistance five to six times as great as concrete, is reported by Toch Brothers. Because of its unusual strength, RIW Epo-Tox may be applied in layers as thin as one-eighth of an inch. It eliminates the need for chipping, jack-hammering and time consuming preparation normally associated with concrete floor repair work. The compound consists of a blend of epoxy resins, selected mineral aggregate, a catalyst and color. There is absolutely no shrinking of the patch or topping.

RIW Epo-Tox can be used not only for patching, but also for resurfacing both large or small areas, and over such materials as concrete, wood, metal, quarry or glass tile and many other types of surfaces. It protects against most industrial acids, alkalies and solvents, which are destructive to concrete floors, and is quick-setting, permitting floors to be returned to normal use after over night curing.

For details, use **Key # FM-12** on inquiry card on page 1.

3-WAY PORTABLE VACUUM

A new machine announced by Advance Floor Machine Co., the Papoose, may be strapped on the back for use when cleaning overhead pipes and fixtures, or for cleaning in confined areas; or, with the one-piece wheel attachment snapped on, it serves for general duty carpet and floor maintenance; or, it may be wall-mounted for use at work bench or assembly table. The lightweight 1 H.P. unit has a one-third bushel capactiy, high impact housing and dual turbine vacuum system. Quickly converts to a powerful blower by exchanging the air intake and exhaust plates.

For details, use **Key # FM-13** on inquiry card on page 1.

FLOOR PAD LINE

A reversible floor pad of webbed nylon, called the Syndisc, is being offered by Brillo Mfg. Co. It is designed to scrub thoroughly without abrading the floor. The pad,

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(For details, use Key # A-12 on card on page 1)

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which is firmly bonded to prevent unraveling in use, is porous and will absorb dirt and old wax, after which it can be easily cleaned for re-use. The solid disc eliminates swirl marks. It requires no special adapters, merely placement under floor machine brush. The line also features steel wool cleaning pads and lamb's wool and felt buffing pads available for use with 6″ twin brush electric floor machines. The pads are equipped with fastening snaps.

For details, use **Key # FM-14 on** inquiry card on page 1.

FLOOR SLAB OVERLAY

A heavy-duty, acid- and water-resistant floor surfacing and patching material has been developed by Stonhard Co. The new product, Stonclad No. 35, is a formulation of resins, activators and a specially processed aggregate. Among the product's primary features is ease of application. The self-curing, non-shrinking overlay is designed to solve some of industry's worst flooring problems—surfaces subject to erosive chemical spillage and abnormally heavy, abusive traffic. All materials are factory proportioned; the formulation is applied with a trowel and forms a tough, durable bond in a matter of hours.

For details, use **Key # FM-15** on inquiry card on page 1.

HYDRAULIC POWER SWEEPER

A new type of power sweeper, operated with a sealed hydraulic drive system, has been announced by The Hydra-Action Co. The Hydra-Sweep unit uses an 18 h.p. motor to operate a drive system that transmits power to the rear wheels. With only one foot pedal, the operator can go forward, reverse, change speeds, and apply the brakes. The sweeper has no transmission, clutch, or drive chain, and doesn't require the usual sweeper adjustments; conventional brake maintenance is completely eliminated. Both drive system and brakes are guaranteed for 18 months. Turning radius is only 53½″; controls are within easy reach of operator. A constant engine speed maintains constant broom speeds. Side broom retracts up to 6″ when it hits an obstacle, cuts gutter broom damage. Hydraulic dump control dislodges caked dirt without hammering. Hopper bottom is 3″ off the floor, will pick up pieces of 2″ x 4″ angle iron, rocks, paper clips, bottles, without "humping" the sweeper or pivoting the hopper.

For details, use **Key # FM-16** on inquiry card on page 1.

SCRUBBER-VACUUM

Two models of a battery powered scrubber-vacuum have been introduced by Finnell System, Inc. Called the Mark 20 and Mark 26, the scrubber-vacs are engineered to clean up to 21,600 square feet of floor per operating hour, in industrial or business areas, or in institutions and other places where noise reduction may be desirable.

The units are powered by four batteries with an operating life of six to eight hours. As part of standard equipment, a small, compact battery charger is included. The Mark 20 has two 11-inch brushes which will clean a path 20 inches wide. The Mark 26 has two 13-inch brushes for cleaning a 24-inch width. Both models have a 17-gallon solution dispenser tank and a 19-gallon pick up tank; counter rotating brushes eliminate torque.

For details, use **Key # FM-17** on inquiry card on page 1.

LIQUID FLOOR CLEANER

A versatile neutral liquid soap manufactured by Masury-Young Co. is said to provide effective cleaning power on virtually any surface, with no harm to the material being washed. It may be used on delicate tiles, resilient, non-resilient and sealed wood floors, among others. It may also be applied to walls, woodwork and all painted surfaces. The soap embodies low-sudsing, free-rinsing properties which make cleaning easier and more economical.

For details, use **Key # FM-18** on inquiry card on page 1.

NEW FLOOR SEALS

An expanded line of permanent floor seals has been announced by Brulin & Co. for use on composition tile and terrazzo floors. Floor-Prep for asphalt tile and similar surfaces is said to be completely odorless and non-flammable. It has an Underwriters' listing for slip resistance. Easily applied and quick drying, it is intended as an undercoat, to be followed by a wax or wax-type finish. Terrashield for terrazzo floors is a concentrated material which serves both as permanent sealer and removable finish, designed for maintenance by buffing. Also reported odorless and non-flammable.

For details, use **Key # FM-19** on inquiry card on page 1.

ALL-PURPOSE CLEANER

Improved Texinol Cleaner, an all-purpose, commercially neutral concentrate for use on all surfaces which cannot be harmed by water, is offered by Walter G. Legge Co. In addition to floors of all compositions, both resilient and rigid, the product is used as a cleaner for tile walls, metal cabinets, lavatories, office furniture and all painted surfaces. The cleaner leaves no soapy film and needs no rinsing. Said to work rapidly with minimum man-effort, Texinol penetrates and emulsifies dirt and grit. It will not scratch or mar surfaces to which it is applied. It contains no free alkalis, oils, injurious acids, or abrasives, the company states. It does not insulate conductive flooring, and is used in the operating rooms of many hospitals.

For details, use **Key # FM-20** on inquiry card on page 1.

FLOOR REPAIR COMPOUND

An epoxy resin patching and surfacing compound, developed by Paramount Industrial Products Co., is said to be practically indestructible, once it cures, and to have perfect dimensional stability. It won't crack, chip, or dust, or pull away from the original floor material during curing or at any time later. It bonds permanently to concrete, wood, steel, mastic, glass or any other clean surface. The waterproof compound is unaffected by vibration, temperature extremes, alkalies, oils and greases. Said to offer excellent protection against acids and solvents. It is pre-proportioned for accuracy, can be applied by unskilled workers, and cures quickly.

For details, use **Key # FM-21** on inquiry card on page 1.

LIGHT DUTY MACHINES

Two new models in the Doyle Vacuum Cleaner line of floor machines have been added in 12 and 14 inch diameters. These smaller commercial machines are reported to be sized for greater operating efficiency in maintaining floor areas of 5000 square feet or less. Typical uses include small medical clinics, motels, stores and offices where operation is restricted due to partitions, furniture, etc. The Model D-12 is powered with a ¼ HP capacitor motor, the D-14 with a ⅓ HP motor. Both feature automatic safety switch, twin-tube adjustable handle, 25 feet of grey rubber cable, and self-retracting wheels.

For details, use **Key # FM-22** on inquiry card on page 1.

MOP TREATMENT PROMOTES BACTERIAL CONTROL

Actual bacteria reduction and protective residual effects on hospital floors, as a result of daily use, is claimed by Majestic Wax Co. for their new product, Hospital Velva-Sheen. The product contains a residual anti-microbial, and is said to to eliminate air-borne dust particles which carry staphylococcus aureus. The treatment is safe for use on all types of floors in hospitals, schools, institutions, etc. Listed by Underwriters' Laboratories as being safe from fire and slip hazards. It is reported as positively not reducing conductivity.

For details, use **Key # FM-23** on inquiry card on page 1.

FLOOR SWEEPING MACHINES

Three improved power sweepers are being offered by Wayne Mfg. Co. The Wayne 703 sweeps more than 40,000 sq. ft. per hour. The maneuverable machine can be used in warehouse aisles and other congested areas. Surplus power assures efficiency under heavy hopper loads, steep inclines, etc. Larger muffler reduces sound level 50%. Exhaust gases are diffused by deflection plate; special muffler design minimizes back pressure. Dual traction and broom drive belts reduce slippage, provide positive sweeper control. New synthetic brushes, resistant to abrasion, temperature extremes, chemicals, etc., increase service life and efficiency.

The 705 and 706, rider-type models, have a new "floating" side broom, new cam-lock fasteners for quick broom reel removal, new engine muffler, expanded metal shield on manifold exhaust for protection, and stainless steel tubing for longer life, longer lasting plastic hose from fan to hopper lid.

For details, use **Key # FM-24** on inquiry card on page 1.

LATEX FLOOR PAINT

A synthetic paint for concrete floors, walls, steps and all other interior and exterior applications, has been developed by Pittsburgh Plate Glass Co. finishes. Florhide Latex Paint has no painty odor and is said to possess excellent alkali, moisture, and abrasion resistance. It may be applied over old paint in good condition. The product needs no acid etching, is easy to apply and dries in less than an hour. It may be waxed after 24 hours curing time. Clean-up requires only warm-soapy water for hands and painting equipment.

For details, use **Key # FM-25** on inquiry card on page 1.

NON-SLIP FLOOR FINISH

A self-polishing, slip-retardant floor finish that retains its high shine with only occasional, touch-up buffing, is offered by Johnson's Wax. Super Shur-Tred was developed through the chemical "tailoring" of synthetic polymers. The formula is said to provide an extra-hard surface, greater safety, resistance to scuffing and water spotting, and it eliminates the need for frequent, heavy buffings. It can be used on all types of floors. The only maintenance required is sweeping or dry

mopping to remove surface dirt and an occasional touch-up with a buffing machine.

For details, use **Key # FM-26** on inquiry card on page 1.

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(For details, use Key # A-15 on card on page 1)

CONCRETE HARDENER

A flush-on preparation claimed to add years to the life of a concrete floor, is reported by Flexrock Co. The product, Flintcrust Liquid, is said to end sanding, dusting and subsequent break-up of floors sustaining rough traffic. The liquid case-hardens the floor, sealing and binding the concrete into a tough surface. It also makes it resistant to the penetration of disintegrators like acid, grease, oil and water. The preparation is easy to apply, is effective immediately, and traffic need not be interrupted.

For details, use **Key # FM-27** on inquiry card on page 1.

PLASTIC REPAIR MATERIAL

A finely ground, plastic-based aggregate has been developed by the Revere Chemical Corp. for repairing cracks, expansion joints, openings, separations or shallow holes in concrete, asphalt and wood floor surfaces. Revco Crack-Fix is supplied ready-to-use and sets immediately, allowing full movement of traffic.

For details, use **Key # FM-28** on inquiry card on page 1.

NEW UTILITY TRUCK

With four three-inch full swivel casters, White Mop Wringer Co.'s new utility truck moves quickly and easily, making it a useful piece of equipment for hotels, motels, office buildings, industrial plants, schools, institutions and most commercial establishments. Casters have soft rubber treads. The sturdy tubular steel frame folds flat for convenient storage. Full weight white canvas bag, with a capacity

of five bushels, has brass grommets. It comes in baked blue enamel or galvanized.

For details, use **Key # FM-29** on inquiry card on page 1.

HIGH SPEED FLOOR UNIT

Designed for high-speed pickup of scrub water and/or dirt, the Hydro-Vac Air Scoop, a product of Advance Floor Machine Co., enables an operator to clean up to 25,000 sq. ft. of floor per hour. The unit cleans a 26" swath. Squeegee attachment for wet pick-up, and bristle tool for dry pick-up are available. Supplied as a complete

vacuum unit, or as an attachment for standard 12 or 16 gallon Hydro-Vac wet-dry cleaners already in use.

For details, use **Key # FM-30** on inquiry card on page 1.

VACUUM CLEANER LINE

Nine new vacuum units for wet and dry cleaning, furnace cleaning and all varieties of special cleaning operations, are offered by Black & Decker Mfg. Co. These range from No. 25, the smallest, which has a ¼ bushel capacity and may be carried on the operator's back, to the No. 55, which is built to fit any standard 55-gal. drum, and can be equipped with a drum dolly for complete mobility, to No. 35, a noiseless model with ample capacity for office and institutional work. The No. 65, available in 8-gal. or 13-gal. capacity, has a variety of industrial and commercial applications; No. 95, with a 13-gal. capacity, has added features of blower outlet, removable cart handle and accessory carrier. The new line also offers a great variety of accessories for all types of cleaning.

For details, use **Key # FM-31** on inquiry card on page 1.

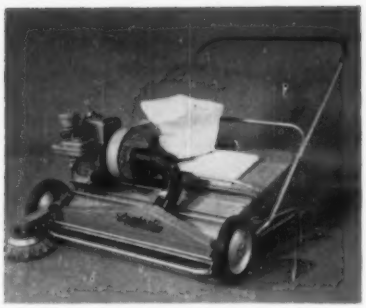
ACRYLIC FLOOR FINISH

A floor finish which combines bright new acrylic with No. 1 yellow carnauba wax has been developed by R. M. Hollingshead Corp. Finish goes on evenly and buffs swiftly to a gleaming luster that can be reshined simply by buffing. Whiz Acrylic Finish is available in 1, 5, 30 and 55 gallon containers.

For details, use **Key # FM-32** on inquiry card on page 1.

NEW FLOOR SWEEPERS

Two new sweeper models—the 28" Model GP-28-B, and the 37" Model GP-37-B, announced by Lambert, Inc., feature suction-blower dust control action in combination with a rotating chassis brush and side wall brush. These machines will remove all types of factory and warehouse debris, including light dust and powder, the company reports. Several types of brushes are offered depending on



the type of floor surface. The new units are highly maneuverable and are designed for both indoor and outdoor operation.

For details, use **Key # FM-33** on inquiry card on page 1.

Fire Fighting School

(from page 35)

have fire students from a wide variety of industries and individual companies. An exception was a recent series when the entire Ansul Fire School enrollment was taken over by representatives of the Socony Mobile Oil Company. The accompanying pictures show some of the action and activities of the Socony fire fighters.

In addition to realistic training in fire fighting, the classes also give do-it-yourself instruction in the all-important techniques of maintaining and recharging dry chemical extinguishers, both hand and wheeled, and stationary systems.

Pictures by courtesy of Ansul Chemical Co.

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(For details, use Key # A-16 on card on page 1)

Passenger Injuries Can Be Cut 50% By Designing Safety Into New Cars

Responsibility for the ever-mounting death and injury rate on America's highways has been placed on the shoulders of executive management of the automobile industry by the editors of a national engineering magazine, *Design News*.

Using highway death rate statistics, supplied by the National Safety Council, Ernest R. Cunningham, *Design News* editor, writes: "At least 50 percent of the deaths and injuries could have been prevented —if the best known engineering technology were being applied by automotive manufacturers."

The magazine does not question the ability of automotive designers to improve design safety but it does add doubt concerning the moral honesty of management for ignoring design safety year after year.

Design News also interviewed Frank Crandell, chief Engineer at Liberty Mutual Insurance Co. and inspected his soon-to-be-announced safety car.

The new safety car has special features built into an actual 1960 automobile. One basic change is an arm chair which contains the rider against injury in all directions, with forward motion restrained by belts or a safety jacket.

Crandell believes that the public should be aware of what he terms the "packaging problem" of automobiles. "The person in the automobile just doesn't stop when the car does."

The insurance company engineer points out that possibly 80 to 90 percent of auto accident injuries could be avoided with "just a few basic modifications in design."

Most of the impact energy during an accident is absorbed in the collapsing of the metal, Crandell reports. "If the person could be restrained from hitting any part of the car during this impact, a large portion of the more than 1 million injuries and 40,000 deaths per year could be avoided.

"A great part of the collision hazard would be eliminated if the car were designed similar to a package for shipping a fragile piece of equipment."

Crandell points out that the increasing injury and death rate is resulting in government activity in the auto safety field.

"A bill recently passed the House and is going to the Senate, making it mandatory for government-purchased vehicles to have certain safety devices. Legislation in some states would apply to all vehicles. The inevitable result is for government to be forced into more activity in this field."

Manufacturing executives argue that cost is prohibitive and the consumer does not want safety features in automobiles, Cunningham writes.

"High tail fins, wrap-around windshields, pushbutton transmission, swayback driveshafts, and other new features are introduced and sold each year. How then can it be so difficult to sell seat belts, padded dashboards and other safety features?

"Safety can be sold—it must be standard—it cannot be optional."

Several design suggestions are offered to decrease head injuries:

"Padded dashboard, large radius curves (to spread impact area), recessed handles and knobs, padding over the door (side impact), flush-mounted rear-view mirror and dome light, and pop-out windshield.

"Similar improvements may be expected in reducing chest and internal injuries when the following safety equipment is designed into cars as standard:

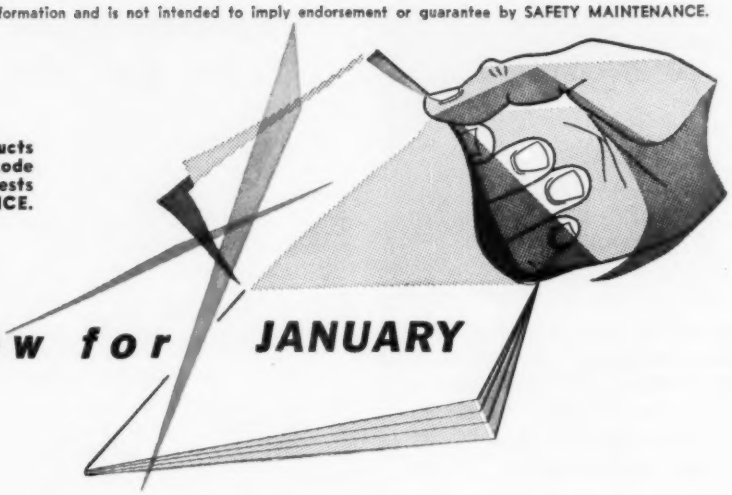
"Collapsible steering columns, seat belts (attached to the frame) and seats securely anchored.

"The addition of a roll bar or some form of reinforcement for the roof of hardtops and convertibles seems mandatory. Present safety-type latches are inadequate. Bolt-type latches on the doors can prevent many deaths by keeping the occupants in the car."

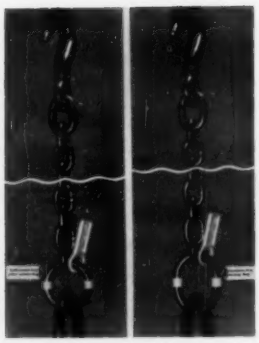
The public has a right to expect the automobile industry to apply available engineering knowledge if it will result in a safer product. . . . The electrical industry does not ask the public if it wants insulation on its wires.

Material appearing in this section is published as information and is not intended to imply endorsement or guarantee by SAFETY MAINTENANCE.

To obtain descriptive literature of products listed, use Reader's Inquiry Card. Write in code number given each item. Send written requests to: Service Dept., SAFETY MAINTENANCE.



what's new for JANUARY



SLING CHAIN FEATURES OVERLOAD WARNING RING

(Use Key # 957 on Inquiry card on page 1)

A NEW CONCEPT in sling chains—a warning ring that provides visual evidence of overload—has been introduced by The Campbell Chain Co. The new Sentry Slings are equipped with rings which elongate when the sling is overloaded. Though stronger than the chain itself, the ring gives immediate warning by changing shape, before permanent damage to the sling can occur. The warning ring was designed especially to protect men and materials. When repairs are necessary, they are quickly made, with warning rings easily replaced at the factory. In most cases, only the ring need be replaced, so repair costs are kept to a minimum. Available in all types, the slings are made from Cam-Alloy steel chain.

NEW COATING EXTENDS ALUMINUM SIDING LIFE

(Use Key # 958 on Inquiry card on page 1)

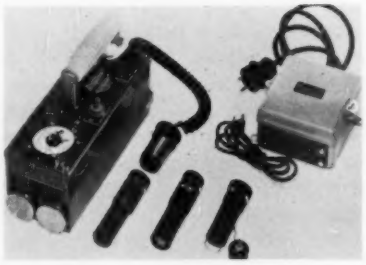
A ONE-COATED baked enamel based on Duracron thermosetting acrylic resins and possessing superior chemical properties that afford longer life for aluminum siding, is offered by Pittsburgh Plate Glass Co. According to the company, the new chemical coating discovery embodies more outstanding properties than other known organic type finishes to offer protection against chipping, cracking, flaking, peeling or blistering and insure a sparkling, carefree, durable finish on aluminum siding.

Extensive field tests throughout the country show the new aluminum coating will endure for years in corrosive salt air and industrial fumes, the company reports. The coating is said to have exceptional qualities of adhesion, flexibility, chemical resistance, durability, color retention, ease and uniformity of application. Available in a complete range of colors which may be rolled or sprayed on.

CHEMICAL CHIPPING AND WELDING GOGGLE

(Use Key # 959 on Inquiry card on page 1)

A NEW CHEMICAL worker's goggle, announced by Bausch & Lomb, is made of molded rubber in Forest Green color, and is designed to be worn by welders and chippers as well as those working with chemicals. Acid resistant, the goggle has soft-rolled edges, is completely comfortable, yet fits the face securely. The new product features a large lens size, S-7 shape, providing wide-angle vision, and will fit over any modern eyeglass frame with ease. Available either with aluminum, non-corrosive vents (for welders and chippers) or without (for chemical workers).



RADIATION SURVEY METER

(Use Key # 960 on Inquiry card on page 1)

A TRANSISTORIZED radiation survey meter has been developed by Gelman Instrument Co. for measurement of alpha, beta, gamma, radiation. The instrument is completely portable operating on 2 standard flashlight batteries. The meter is rugged, shockproof, and watertight. The survey counter has a 275 degree 4¼ inch long scale for extra accuracy and ease in reading. It will operate in temperatures ranging from —22°F to 125°F with an absolute accuracy of 15%. The electronic circuitry is stabilized so that it requires no recalibration. The survey meter has a built in loudspeaker and earphones. Geiger tubes may be easily interchanged for different purposes.

When not in use the geiger probe is stored in a special shock absorbing compartment. A neon light indicates battery condition. The instrument has a built in speaker and earphone connections; earphone also included. A gamma sensitive geiger tube is supplied with the survey meter. A separate power supply may be ordered so that the survey meter can be used on line current in the laboratory. Female plugs are built in for attachment of power supply.

VARIABLE TORQUE LIMITER

(Use Key # 961 on Inquiry card on page 1)

A DEVICE THAT prevents damage to motors and drives by instantly disengaging power upon overload and jam-ups has been developed by Torque-Master Div.

Interchangeable bushings are used from ½ in. to 1 7/16 in. bores. Single, double, triple groove sheaves and sprockets fit without machining. Timing belt sheaves and rotating members are easily mounted.

It can be adjusted manually to release and "sound-off-alarm" at any predetermined torque setting from 10 lbs., ft-to-150 lbs., ft., or can be locked in positive drive with no release. The XB-150 acts as an automatic shear-pin mechanism, slipping only when jam-up occurs and re-engaging when overload is relieved. Torque output remains constant when exposed to changing temperatures, weather, oil and abrasive conditions. All metal construction minimizes maintenance.

LADDER SAFETY TESTER

(Use Key # 962 on Inquiry card on page 1)

AN AUTOMATIC, portable hydraulic ladder testing machine, weighing only 25 pounds, has been introduced by Hydraulic Systems, Inc.

The machine applies thrust to ladder rungs, quickly recording the thrust on a direct reading gauge. By careful observation of the gauge, the operator can determine the exact breaking point of a defective rung, preventing the possibility of a serious accident. Releasing the thrust automatically unlocks the rung clamp so that the unit is ready to move to test the next rung. The operator can change the thrust adjustment from one to six hundred pounds.

The ladder tester can also be used as a tensile strength tester for determining stretching and breaking capacity on cable, wire rope and chain. Various dies may be adapted for compression testing of other building and construction materials such as aluminum, steel, concrete, and stone. A slight modification even allows it to be used as a portable scale for measuring weights up to 600 pounds.

HEATING-LIGHTING FIXTURE

(Use Key # 963 on Inquiry card on page 1)

A CIRCULAR infrared fixture for indoor-outdoor heating, which has a built-in incandescent bulb, has been developed by Infrared Corp. of America. The surface mounted 800 watt, 120 volt Quartzheet reaches top temperature within one minute. A high quality, gold-plated reflector is said to achieve 40% more heat than polished aluminum, and a surface which resists weather and atmospheric change. Cited as an outstanding characteristic, the circular tube emits a pin-point circle of infrared heat, like the sun, without hot spots. It is said to be far more compact than straight tube units, generate more heat per kilowatt than any known conventional heating device, and be easier to install.

EXIT LIGHT-ALARM

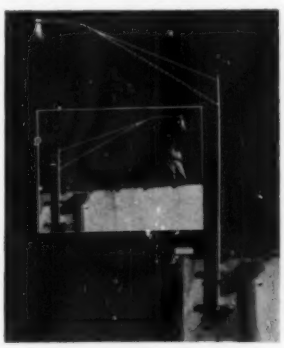
(Use Key # 964 on Inquiry card on page 1)

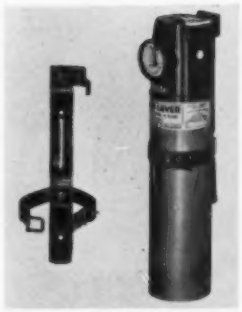
A COMPLETELY automatic self-contained exit light and alarm, to guard against power failure, is offered by Infra Corp. Upon failure of normal power sources, the unit switches over to a battery source that maintains the lighted EXIT sign and blows an intermittent horn signal. This indicates the location of the exit when smoke, fire, etc., renders the sign not visible. Unit may be either shelf or wall mounted.

HIGH LIGHT MOUNTING

(Use Key # 965 on Inquiry card on page 1)

A SWING ARM High Light for wall mounting mercury, vapor or incandescent lamps is available from Natale Machine and Tool Co. It is designed for installation on the walls of low buildings to elevate light for proper light pattern coverage. Building mountings eliminate pole obstructions of driveways and loading zones. Light swings over roof and can be lowered for safe, easy maintenance. Lamps are said to burn longer because of the cushioning effect of Circle-D's floating spring mounted lamp socket.





EXTINGUISHER BRACKET FOR DRY CHEMICAL UNIT

(Use Key # 966 on Inquiry card on page 1)

A NEW FIRM GRIP clamping band bracket with automatic un-lock feature for its 2½ pound pressurized dry chemical portable extinguisher has been introduced by Walter Kidde & Co. The bracket has a built-in projection which locks the valve against accidental discharge. A second guard against such discharge is a metal lip which passes under the actuating lever when the extinguisher is in its bracket; when the unit is removed, it is automatically unlocked and ready for action without the necessity of pulling a locking pin. A toggle release device permits the extinguisher to be freed from the bracket with the pull of a finger.

EMERGENCY DRENCH SHOWER

(Use Key # 967 on Inquiry card on page 1)

A NEW DRENCH SHOWER assembly with a ratchet-type quick-opening valve has been introduced by Haws Drinking Faucet Co. A short pull on the valve chain causes the ball valve to instantly release a deluge of water at 34 gpm (under 40 lbs. pressure). It continues to flood the contaminated person until the chain is pulled again. The reliability of Haws special ratchet action valve eliminates any chance for valve "drift" which might cut the flow of water in an emergency.

The shower head is satin chrome finish cast brass with a 10" diameter adjustable face. This large face will deliver a complete and instantaneous flood of water over the contaminated person, diluting and washing away acids, caustic chemicals, volatile liquids, etc. Two models are available. Model 8161-H for horizontal water supply, and Model 8161-V for vertical water supply. All functional parts of both models are made of highly corrosion-resistant red brass; spring is stainless steel.

POLY GLOVE DISPENSER

(Use Key # 968 on Inquiry card on page 1)

AN EASY-SERVICE dispenser for Wil-Gard Poly-D (polyethylene disposable) Gloves, is announced by the Wilson Rubber Co. Seventy-two gloves, each mounted lightly on paper for easy removal from the box, are included in each dispenser. Built-in adhesive holds the unit in place on wall, or almost any place, without nails. Metal eyelet on the tab for nails also is available. The gloves are pre-powdered with Bio-Sorb, making them extremely easy to slip on or take off. Lightweight, flexible and moisture-proof, they feature strong, heat-welded seams with super-smooth edges that provide excellent resistance to snagging and tearing, without sacrificing manual dexterity and touch-sensitivity. Chemically inert, highly resistant to many chemicals, powders and resins, they also safeguard precision parts against perspiration corrosion and keep foods free from hand contamination.

PLASTIC EAR PLUG

(Use Key # 969 on Inquiry card on page 1)

A NEW, PLASTIC anti-noise ear plug for military and commercial aviation uses and for general industrial purposes has been introduced by American Optical Co. The device, called Hear-Guard, is about three-fourths of an inch long, comes in three sizes, small, medium and large, and is white in color; contains a safety tab for easy and safe insertion. While the ear plug sharply reduces industrial noises, it still permits the wearer to hear conversation. Can be cleaned with soap and lukewarm water.

PLASTIC TRAFFIC MARKERS

(Use Key # 970 on Inquiry card on page 1)

EXTRUDED VINYL materials for zone and traffic marking have been developed by Trafficaide Corp. They are said to be a lasting replacement for fading paint lines, easier to install, and ready for traffic immediately after installation. Two types are available; both are self-adhering pressure sensitive tapes which will stick to a wide variety of surfaces and do not require any machines or skilled labor to install.

Heavy duty Trafficaide markers, supplied in rolls, have a tapered edge to prevent scuffing. Produced in several colors, they are self cleaning and resist the action of salt, strong or diluted acids, alkalies, gasoline and oils incidental to normal traffic. Mactac is produced in strips and rolls with a pressure sensitive backing. It bonds directly to all surfaces and is recommended for all around usage in areas where it will not be subjected to excessive grinding and scraping from heavy traffic. Both types can be supplied in dayglo color or special metallic finishes.

VENTILATION BLOWER

(Use Key # 971 on Inquiry card on page 1)

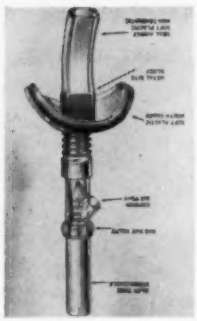
DESIGNED FOR ventilation of large tanks or other confined areas, the Tube-axial Blower TA-16, mounted on pipe skid rails, is readily portable, or may be permanently installed. The blower, a product of Coppus Engineering Corp., has an adapter outlet suitable for attaching 16" diameter ventilating tubing. If the unit is to be used with non-collapsible suction tubing, the inlet can be provided with an adapter in place of the inlet bell. Adapter and bell are not required when unit is installed in a 16" diameter duct. Cast aluminum fan has non-overload characteristics. Manual motor starter has overload protection.

M-TO-M RESUSCITATOR

(Use Key # 972 on Inquiry card on page 1)

A SIMPLY OPERATED, low priced mouth-to-mouth resuscitator for home or industry, has been announced by Wilson Products. No. 1 Brook Airway has a non-return valve and expired air vent. Should the victim begin exhaling air or moisture, these completely eliminate the possibility of foreign material or exhaled air passing from the mouth of the victim to that of the rescuer. This minimizes chance of communication of disease. The blowtube is easily removable for cleaning and sterilizing with soap and hot water.

The flexible neck on the airway permits immediate resuscitation in awkward positions. The clear, pliable mouthguard seals the mouth and permits a view of the color of the lips. The mouthguard is held in position with the same hand that maintains optimum head-back, chin-up position. The oral airway provides clear passage of



air with no irritation to the throat. With the Brook Airway, the rescuer can see if the air passage is open and progress of the resuscitation can be seen by watching the rise and fall of the chest. Unit is economically priced.

TOTE BIN FOR FLAMMABLES

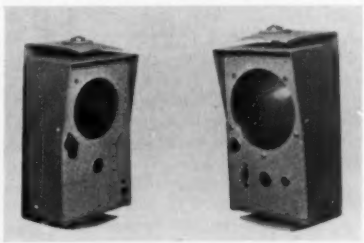
(Use Key # 973 on Inquiry card on page 1)

400-GALLON CAPACITY liquid Tote Bins, fabricated by Tote System, Inc., have received Interstate Commerce Commission approval for the handling of flammable materials. The aluminum bin, with a large top filling opening and a bung opening in the top as well, plus a bottom discharge opening, can be used for interstate shipment, storage and discharge of all liquids having a flash point above 20°F and all viscous liquids irrespective of flash point. The company anticipates heavy use of the Tote tanks for handling numerous chemicals and petrochemicals previously unshippable in unit containers.

BURGLAR-INTRUDER ALARM

(Use Key # 974 on Inquiry card on page 1)

A NEW PHOTOELECTRIC beam burglar-intruder device has been introduced by Kidde Ultrasonic & Detection Alarms Div. Called Lyne-O-Larm, it comprises a pro-



jector and a receiver. The projector transmits an invisible infra red beam to the receiver which can be located up to 250' away. Transmission may be either a straight line or, with mirrors, around corners. Any object passing through the beam causes an alarm to sound at any desired location(s).

Lyne-O-Larm units are easy to align, have sealed beam projector lamp, are fully transistorized and employ printed circuits. They operate on a low voltage power supply (110 AC and transformer) and have a standby battery power supply which takes over, if normal power fails, for up to four hours. Units measure 4¾" deep by 5½" wide and 11¾" high. They are approved by Underwriters' Laboratories.

ELECTRICAL TAPE FOR SUB-ZERO APPLICATIONS

(Use Key # 975 on Inquiry card on page 1)

A VINYL PLASTIC tape with a rubber-base adhesive has been specifically engineered by Permacel Co. for use in cold weather applications, such as wiring work in refrigerated areas. The tape remains flexible down to —50°F., but is reported to work equally well under more moderate conditions, and remain serviceable under operating temperatures as high as 180°F. In addition it has high dielectric strength. Permacel 295 is also said to have excellent acid and abrasion resisting properties, as well as flameproofness.

LADDER RUNG GRIPPER

(Use Key # 976 on Inquiry card on page 1)

A STAINLESS STEEL rung gripper which fits like a glove and may be comfortably attached to each hand, while causing no interference with climbing or working, has been developed by Rose Mfg. Co. The new device, called Ladder Climber, is said to attach to the rung and release almost as fast as the human hand, so that the climber is not slowed up in his ascent. Sturdy and light in weight, the gripper is attached to strong webbing that fastens to the worker's safety belt.

HYDRAULIC WORK STAND

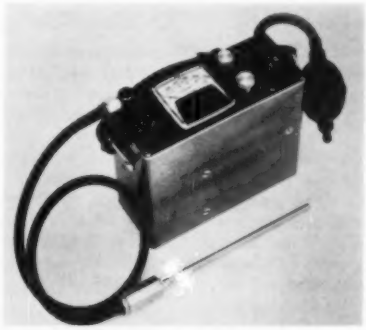
(Use Key # 977 on Inquiry card on page 1)

AN HYDRAULIC-OPERATED work stand, featuring an extendable work platform that raises to a height of 100-inches above the floor, has been introduced by Bil-Jax, Inc. Area of the working platform, with folding side catwalk in raised position, is 56" by 126". In lowered position, platform is 30" above the floor. Guard rails are of tubular steel. Positioners hold stand firmly to floor or ground when in use. Stand is available with variations in size and other details, for use on a wide variety of service and maintenance jobs.

DRAIN CAN FOR FLAMMABLE LIQUIDS

(Use Key # 978 on Inquiry card on page 1)

A NEW CAN for draining flammable liquids from industrial drums, automotive crankcases, and other containers has been introduced by Eagle Mfg. Co. The top of the can has a large funnel with a wide opening and perforated metal fire baffle to guard against flame or spark igniting the contents. The top is easily removed for emptying or cleaning the can. The can has a seamless body drawn from one-piece 24-gauge terne coated steel, and electrically welded under electronic control. Equipped with a heavy wire handle for easy carrying. Unit has Factory Mutual approval. Capacity is 3 gallons.



VAPOR AND GAS INDICATOR

(Use Key # 979 on Inquiry card on page 1)

A NEW INSTRUMENT, the Model SS, announced by Johnson-Williams, Inc., is reported to be 12 times as sensitive to vapors as the ordinary combustible gas indicator. It will detect very minute amounts of combustible gases and toxic vapors, such as toluene and xylene, in concentrations far below the accepted MAC limits. Applications include use in arson investigations to establish the fact that kerosene or other flammable liquid was used to set a fire, and quality control through detection of small concentrations of organic vapors given off during the processing of materials. The portable instrument has a rechargeable nickel-cadmium battery that lasts indefinitely. It comes complete with hose and probe for ease in taking samples.

RUST-INHIBITIVE PAINTS

(Use Key # 980 on Inquiry card on page 1)

NEW PAINTS which combine the strength and adhesive qualities of epoxy resins with a new rust-fighting phenomenon called Cationic Action, are being marketed by Garland Co. The Rust-Go coatings are claimed to have extraordinary properties for penetrating through bare metal and depositing a rust-preventive film that continues to fight rust for the life of the coating. The epoxy film is said to seep into the microscopic pits in the surface and drive out air and moisture.

WORK SHOE COVER

(Use Key # 981 on Inquiry card on page 1)

A LIGHTWEIGHT, flexible work rubber, designed to fit over work shoes, is being manufactured by U. S. Rubber. A deeply corrugated pliable shank stretches so that the overshoe fits easily over any type of shoe. Pak-A-Way waterproof rubber is made of a tough, translucent material that is durable and washable. Anti-skid sole adds safety in working on wet, slippery surfaces, including fats, greases and oils. Available in four basic sizes.

SNOW AND ICE MELTERS

(Use Key # 982 on Inquiry card on page 1)

AN IMPROVED CHEMICAL compound for thawing ice and snow is being offered by Revere Chemical Corp. in a range of sizes for industrial, commercial and individual use. The pellets are claimed to have 30 times the thawing capacity of salt at 0°F. Used as directed, the compound is said to be harmless to grass and other vegetation. It can be applied mechanically or by hand, and is designed for use on driveways, streets and sidewalks, loading docks, sewers, gutters, downspouts, etc.

HIGHWAY SAFETY LIGHT

(Use Key # 983 on Inquiry card on page 1)

A TRANSISTORIZED highway safety light suitable for mounting on saw horses and barricades is available from The Fisher-Pierce Co. The Safe-T-Flash produces precisely-timed flashes through a 7-inch amber colored plastic lens that is designed for maximum brilliance. It operates continuously at a choice of two flash rates and flash durations: 135 flashes per minute, 55 milliseconds duration; 67 flashes per minute, 110 milliseconds duration. The lens and battery case form a one-piece enclosure of Tenite Butyrate plastic that will not shatter or crack under normal use. Further protection is provided by a corrosion-resistant steel housing with a heavy-duty catch. The unit is said to be unaffected by direct sunlight, rain, sleet, hail, snow or dust.

EXTRA-LARGE SHEER GLOVE

(Use Key # 984 on Inquiry card on page 1)

AN EXTRA-LARGE size has been added to their V-10 Nimble Finger gloves by Pioneer Rubber Co. These tissue-thin gloves of Pylox are designed especially for jobs requiring extreme finger sensitivity and hand dexterity. Features include length of 10½-inches for ample wrist and lower arm protection; flare design of cuff opening for ventilation; textured inside finish for comfortable fit, and non-slip grip when worn reversed.

Nimble Fingers are said to improve and speed up production by replacing old-fashioned, thick glove styles that would interfere with worker efficiency and handling. They are resistant to the acids, alkalis, oils, greases and some solvents usually encountered in light hand work. The Pylox material possesses non-allergenic properties which make the gloves ideal for persons allergic to rubber gloves. They also guard against contact from bacteria.

NEW WELDING GOGGLES

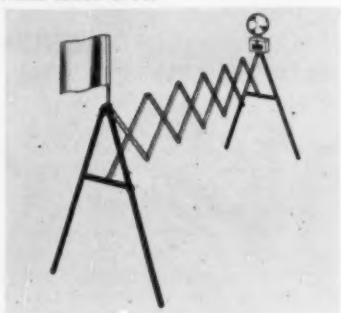
(Use Key # 985 on Inquiry card on page 1)

TWO ECONOMICAL welding goggles, providing protection against a wide range of eye hazards, are being marketed by Air Reduction Sales Co. The Airco-Ajax gas welding goggle is designed for use in gas-welding, cutting, burning and furnace operations, while the Ajax super cover goggle is intended for wear over spectacles during similar operations. Both types of sturdy goggles have ventilated side-shields which keep out stray light and metal splashes and provide adequate ventilation to prevent lens fogging. Headbands are easily adjustable. Eyecups for the gas-welding goggle are individually shaped with contoured surfaces for greater operator safety and comfort.

AIRCRAFT EXTINGUISHER

(Use Key # 986 on Inquiry card on page 1)

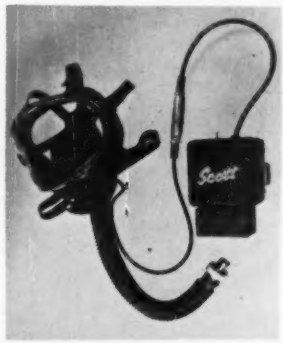
A PORTABLE FIRE extinguisher, designed specifically for aircraft use, incorporates a new, extra light steel cylinder and trigger-operated aluminum valve. Including a 2-pound charge of carbon dioxide, entire assembly weighs only 6½ pounds, which makes it 1½ pounds less than the lightest of the current, standard extinguishers having a 2-pound charge. It is used on Class B and Class C fires. Approved by Underwriters' Laboratories, Inc. Manufactured by Kidde Aero-Space Div., Walter Kidde & Co.



REFLECTORIZED BARRICADE

(Use Key # 987 on Inquiry card on page 1)

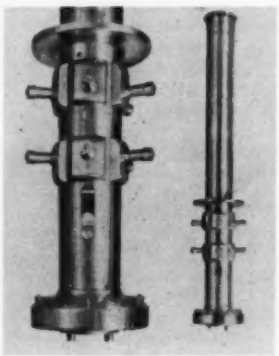
A FOLDING STEEL barricade, which opens to a width of 8 feet and retracts to less than 12 inches, for convenient storage and transportation, has been announced by the Albert W. Pendergast Safety Equipment Co. The Guard-Gate unit has glass bead reflectorization on the cross members for added visibility in either direction. Finished in yellow and black enamel, the barricade is furnished with two red fluorescent danger flags. Flashers are optional.



SPEAKER UNIT FOR RESPIRATORY EQUIPMENT

(Use Key # 988 on Inquiry card on page 1)

A LIGHTWEIGHT, COMPACT, powerful speaking device, called the Voice-Pak, has been designed by Scott Aviation Corp. for use with protective breathing equipment. Voice is transmitted through a small powerful microphone to a strongly protected, waterproof speaker attached to the belt. The unit is completely transistorized. It comes complete with pen-light type batteries, Scottoramic mask with nosecup, breathing tube and regulator coupling. The lightweight unit fits all Scott Air-Paks. Intended for use in hazardous atmospheres to enable emergency crews, maintenance men and technicians to maintain communications.



METERED VALVE SHOWER PROVIDES 40 SECOND BATH

(Use Key # 989 on Inquiry card on page 1)

A NEW WATER-SAVING device is available on the entire line of multi-person shower facilities manufactured by the Bradley Washfountain Co. A supply of either cold or tempered is delivered for about 40 seconds by pulling a button. Each shower head is individually controlled. These showers conserve water and speed up bathing by groups of users, since they cannot be left running. For use in industry, institutions, etc., the showers can also be furnished with partitions.

"SAFETY MAINTENANCE" MAGAZINE

75 FULTON STREET
NEW YORK 38, N. Y.

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SEND THIS PERSONAL SAFETY MESSAGE TO EVERY ONE OF YOUR EMPLOYEES.

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- You get enthusiastic safety cooperation instead of tolerance . . . from every employee . . . every month!

. . . talks the worker's language!

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packed with pictures, alive with animated cartoons, touched with humour that gives snap to your message, it makes safety interesting and down to earth. Twelve times a year it covers accident hazards. Across the nation leading industrial firms state it's the only safety paper their employees will read . . . and take home to their families.

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INSIDE PAGES
(Pages 2 and 3)

THOUGHTLESSNESS IS A THIEF
He'll steal his way into what you're doing, distract your attention and walk off with a finger, arm, eye or foot. Thoughtlessness takes many forms: it may be daydreaming, or worry about some personal problem, or just plain inattention. Anything that distracts you, especially around machinery, is a thief of your personal safety.
PLAYFULNESS IS A PIRATE
He is a deceptive rascal. His hi-jinks may put him in the spotlight, but his practical jokes and showing-off often result in serious bodily injury and even death. And note this: he, himself, has lost a leg! As so often happens, horseplay can boomerang and the practical joker gets hurt too!
What You Should Know About Carbon Monoxide
This is a picture of carbon monoxide gas!
That's right, you can't see it. It's odorless, non-irritating, tasteless, practically odorless, but also deadly.
Here are the symptoms of carbon monoxide poisoning. First, a tight feeling across the forehead, followed by headache, throbbing temples, weariness, weakness, dizziness, nausea, loss of muscular control, increased pulse and breathing. BUT if the concentration of the poison gas is high, there may be loss of consciousness without these warning signals.
Just a few breaths of air containing 1% carbon monoxide can be fatal . . . so can one part of carbon monoxide in a thousand parts of air when breathed for 90 minutes.
It is possible for carbon monoxide to leak inside of a car if there is a loose exhaust pipe or manifold connection, blown-out exhaust gasket, cracked exhaust manifold, or leaky muffler. Play it safe.
1. Be sure your muffler and exhaust are in good condition (they can leak long before they become noisy).
2. Always keep a car window open, even a little, for fresh air.
AN INTIMATE LOOK AT FOUR VILLAINS
SAFETY LAZINESS IS A SIMON LEGREE
If you are lazy about safety rules, then accidents will have the whip hand. We are safety-lazy when we don't bother to use mechanical guards, to take time to get the right tools for the job, to wear protective equipment such as goggles, hard hats, safety shoes, respirators, gloves, etc. Yes, Simon Legree has a whole pack of accident hounds to trail you.
HAZARDOUS METHODS ARE A HOLD-UP MAN
This villain, unsafe work habits, likes to lie in ambush for the unwary. But how do we fall into bad working habits? It may be by trying to cut corners, by wanting to keep to the old way of doing things, or by over-confidence. It's hard for anyone to believe that an accident can happen to him. It's easier to make excuses to ourselves for ignoring safety rules, but alibis only lead us up a blind alley with an accident waiting in ambush.
Two Excellent Reasons
For Wearing Safety Shoes

EMPHASIZES SELF INTEREST

Your employee's self interest in his own safety is always emphasized. Constant safety consciousness is promoted by covering household hazards, transit to and from the job and on the job caution against accidents.

CLEVERLY ILLUSTRATES THE POINT

Artwork is carefully chosen to lodge home each point persuasively. The cartoon style makes YOUR SAFETY NEWS as familiar and welcome as the picture packed Sunday supplement.

WINS READERS WITH A FOLKSY APPROACH

Keeping the contents folksy, adding the light note of humor, gets your message across with a nudge instead of a bludgeon. Your monthly chat gets enthusiasm instead of indifference.

RIVETS ATTENTION WITH VIVID COLOR

Generous use of color sparks the message, and adds impact to the contents of YOUR SAFETY NEWS. Each issue is as alive as any news-stand favorite.

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